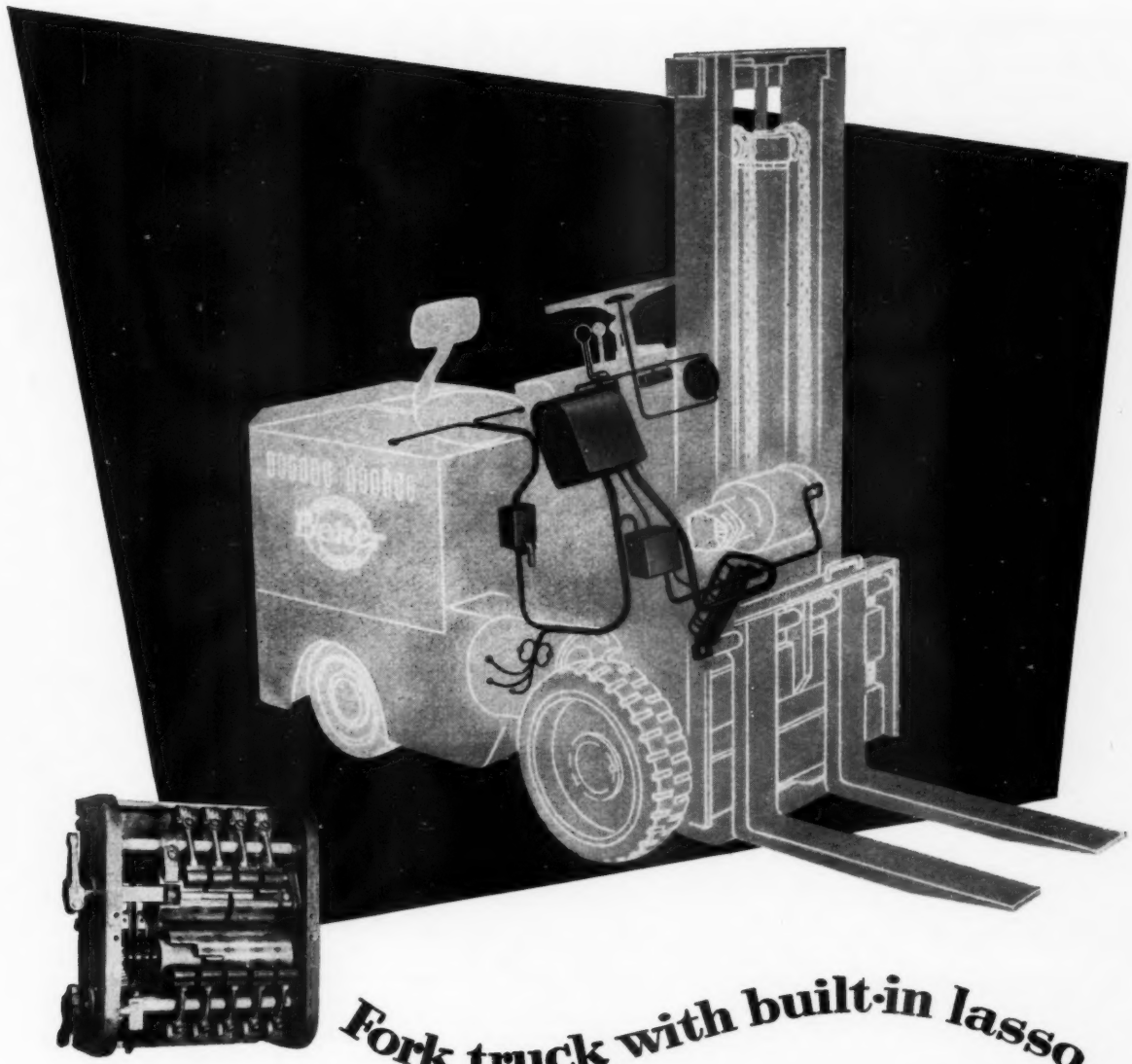

Fork truck with built-in lasso ...for cowboy drivers

● Over-enthusiastic truck jockeys can't hurt Baker Fork Trucks or loads carried (or themselves) by jumping from "low" to "high" or forward to reverse.

Baker drum-type controllers take motor speed in successive steps through acceleration stages, no matter how "heavy" the foot on the accelerator.

Jack-rabbit starts, with resulting motor burnouts, are impossible. Dynamic braking slows truck to a smooth stop, sparing driver and load, and acts as auxiliary brake on steep grades.

Motor strain or jolt from sudden direction changes is prevented by requiring truck to come to a virtual stop before reversing circuit applies.

All this adds up to safer operation for driver, truck and load, less down time, lower repair bills and longer truck life.

For more detailed information on Baker Fork Truck features, write for 4-color sketch book —Bulletin 64. The BAKER-RAULANG Company, 1251 West 80th Street, Cleveland 2, Ohio.

Baker.
industrial trucks

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

News of PE Clubs

Indianapolis—Twenty-eight members and guests attended the February meeting of the Central Indiana Plant Engineers' Society. Guest speaker for the evening was Mr. Robert Meusing, Socony-Vacuum field engineer for Northern Indiana. Mr. Meusing gave a very interesting talk on oil viscosity, the chemical aspects of oil and lubrication in general. Several new members were voted into the Society at this meeting. The March meeting will consist of a dinner at Firestone Industrial Products Division, Noblesville, Indiana, and a tour of the plant.

Chicago—At their March meeting, the Plant Engineers' Society of Chicago listened to a talk by Mr. Carl Jensen, senior district engineer, Westinghouse Electric Corp., on the subject: "Group Replacement of Fluorescent Lamps." A discussion on general plant lighting followed the talk. At the April meeting, they will hold their annual election of officers. In addition, the group will also formulate plans for future meetings.

Plant Engineering in Small Type

ALL OF THE 1953 issues, Volume 7, of PLANT ENGINEERING are now available on microfilm. Readers interested in getting Volume 7 or any of the previous volumes of Plant Engineering for their company library, should write to University Microfilms, 313 North First Street, Ann Arbor, Michigan.

Please note that these microfilms are limited to firms and individuals on our controlled and subscription lists.

How Standards Got Started

"ONE OF THE first attempts to set up a standard in the Western world took place in the year 1120, at the time of the first Crusades. King Henry I of England ordered that the ell, the ancient yard, should be the exact length of his arm, and commanded that distance henceforth to be the standard unit of comparison of lengths throughout his kingdom."

With this beginning, the reader is introduced to the sixteen humorous illustrations that appear in the booklet "Through History with Standards" published by the American Standards Association.

Some of the other interesting stories and illustrations tell how a standard brick became compulsory in 17th Century Boston, how mass production began with a contract for muskets, how a standard for steam boilers brought new safety to an old hazard, and many others.

Readers interested in getting a copy of this booklet should write to American Standards Association, 70 East 45th Street, New York 17, N. Y.

New Plant Engineer

Ralph Morse was recently named plant engineer for Chandeysson Electric Co., St. Louis, Missouri. In his new capacity, Mr. Morse will be in charge of all plant utilities, construction and maintenance. He will also supervise maintenance of plant equipment and will carry out special assignments for the engineering and plant manager.

Formerly supervisor of Chandeysson's testing facilities, he has been with the company four years. Prior to joining the St. Louis firm, he served as an electrical engineer for the Missouri Pacific Railroad. He is a graduate of the University of Missouri's engineering school.

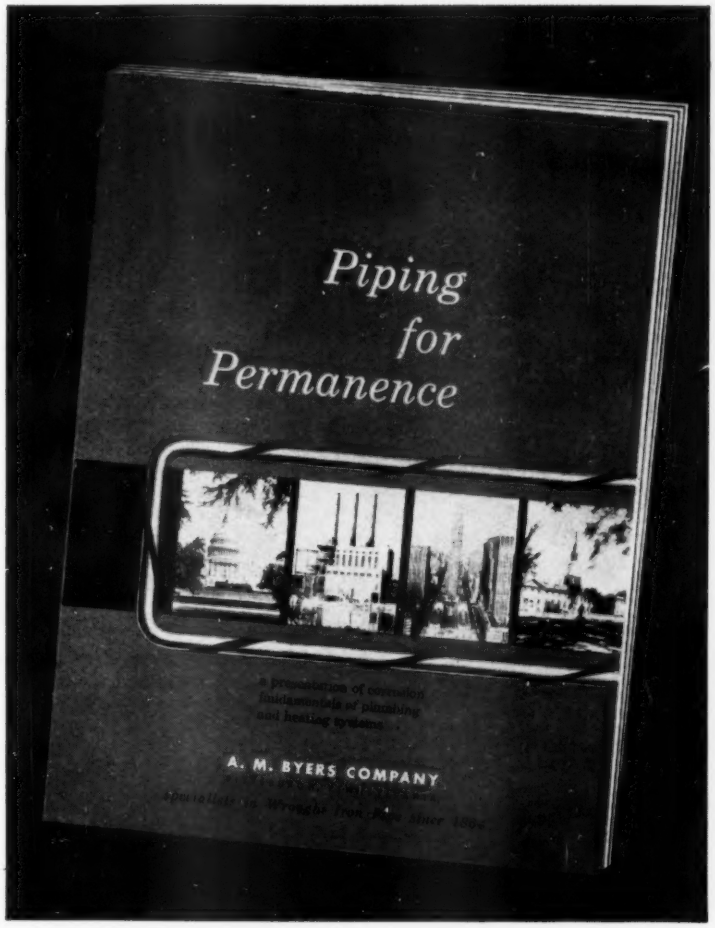
New Plants in the Making

Clark Equipment Co. plans to erect a new plant on the outskirts of Benton Harbor, Michigan. This new 145,000 sq ft building will be used as an assembly plant for a new line of tractor shovels to be produced by Clark and for the assembly of power shovels now made in the present Benton Harbor plant . . . Ground was broken for a new 237,000 sq ft plant in Long Beach, California, to house the **Grayson Controls Division** of the **Robertshaw-Fulton Controls Co.** The new plant area will feature wide span bays of 100 ft and overhead clearance of 16 ft with high intensity fluorescent lighting throughout . . . **National Cylinder Gas Co.** is constructing a plant on the south side of Chicago for the manufacture and distribution of liquid oxygen . . . First plant in the Pacific Northwest to manufacture wood panels from sawmill shavings will be built in North Bend, Oregon, by **Weyerhaeuser Timber Co.** . . . As a result of forecasted higher demands for large industrial control equipment, **General Electric Co.** plans to build a new plant in Roanoke County, Virginia . . . **White Motor Co.**

Plant Engineering is published monthly at Chicago, Ill. Subscriptions one year $10 in the U. S. A. Canada $11; Elsewhere $12. Acceptance under Section 34.64, P. L. & R. authorized by Post Office.

Your copy is ready

...PIPING FOR PERMANENCE



The nature of piping problems in heating and plumbing systems, and the methods by which they can be solved, are discussed in detail in this 32-page Bulletin.

Prepared by our Engineering Service Department, this Bulletin is based on the information we have gathered from analysing complete data on thousands of piping installations of every type, under all kinds of conditions. This pool of experience has been condensed between covers in a clear, easily followed story to help you realize greater piping economy in your installations.

The bulletin also includes a roundup of wrought iron pipe installations from every part of the country and presents practical evidence of the results obtained from the use of the material. These past service records are providing leading engineers everywhere with a practical guide for today's selection.

Your copy is ready. Write for it today.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Dept.: New York, N.Y.

You'll find information on:

Requisites of a piping system—brief review of piping material properties essential to long-life, economical service.

Building-piping systems—definition of individual services; brief discussion of conditions that threaten service life in plumbing and heating systems and solutions; fundamentals of design and installation that may be used to reduce the rate and severity of corrosion.

Water and water problems—background facts on interpretation of water analysis and water treatment.

How Byers can help you—available data on piping installations to solve individual problems; how you can benefit from the records of our Engineering Service Department.

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CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

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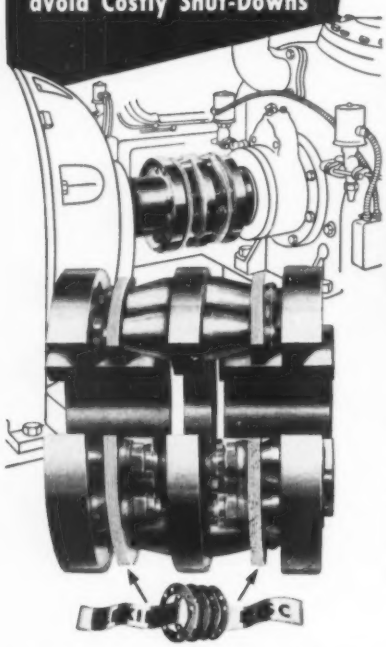
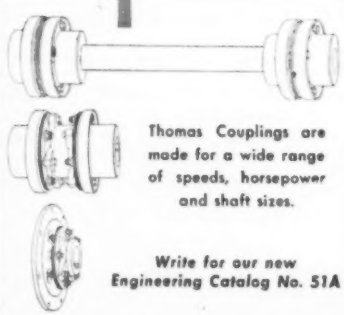
Specify THOMAS ALL METAL
FLEXIBLE COUPLINGS
for Power Transmission to avoid Costly Shut-Downs



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.
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'ROUND ABOUT

is erecting a new plant in Exton, Pennsylvania, for its Autocar Division. The new plant is of reinforced structural concrete with a steel-beam, metal-deck roof. Tilt-wall construction was used.

Concrete slab is tilted into position. The reinforcing rods between each section will be welded together and the space between them filled with concrete

Concrete slabs, reinforced by steel rods, were cast flat on the scene in 30-ft lengths, 14 ft high and 8 in. thick. After the slabs were tilted into place by a mobile crane, the reinforcing rods were welded together and the joints sealed with poured concrete.

Construction Outlook for '54

CONTINUATION OF industrial and process plant construction during 1954 at substantially the same high level as 1953's record was predicted by the officers of the National Constructors Association at their annual meeting.

While some types of construction have tapered off from the high marks in '53, retiring president John J. O'Donnell said that other types of construction—such as petrochemical and power plants—will keep the over-all level of heavy industrial construction as high as the previous year.

Association leaders believe that in light of the more competitive conditions in industry in general, engineering-construction companies and their clients will continue to emphasize their joint efforts to stabilize construction costs. There already are some indications that 1954's industrial plants will be as simple and unadorned as possible—consistent with long life and efficient operating conditions. They also said that increasing labor productivity in the field will continue to be the more effective way to lower field construction costs.

LP Gas—Handle with Care

GROWING POPULARITY of liquefied petroleum gas as an all purpose fuel, has prompted the safety engineers of the Association of Casualty and Surety Companies accident prevention department to publish a new pamphlet, "LP Gas—Safe Handling and Use."

According to a study made in 1954, 165 persons were killed and 594 injured in 129 LP gas explosions and fires during the last two decades because the properties of the fuel were not understood and safe practices necessary in its handling and storage were not followed.

The 60-page pamphlet contains all the latest information in an effort to inform the public, vendors, industrial plants and motorists, how its inherent hazards can be safely controlled. It describes the composition, properties and behavior of the gas.

Copies may be obtained from any of the Association's member companies, or may be obtained from the Association itself at 60 John Street, New York 38, N. Y. They are priced at 25 cents a single copy, and are also available in quantity discounts.

Glad You Could Come

"I wish to express the appreciation of the members of the Plant Engineers' Societies of Chicago, Calumet Region and Northern Illinois, for the wonderful way the plant engineers from the other Societies throughout the country attended the recent get-together luncheon.

"Also I want to thank the men interested in forming such a Society in their area for taking part in this get-together held in conjunction with the recent Plant Maintenance and Engineering Show." Ted Ramond, Plant Engineer, Goodman Manufacturing Co., Chicago, Illinois (chairman for the Plant Engineers' Luncheon).

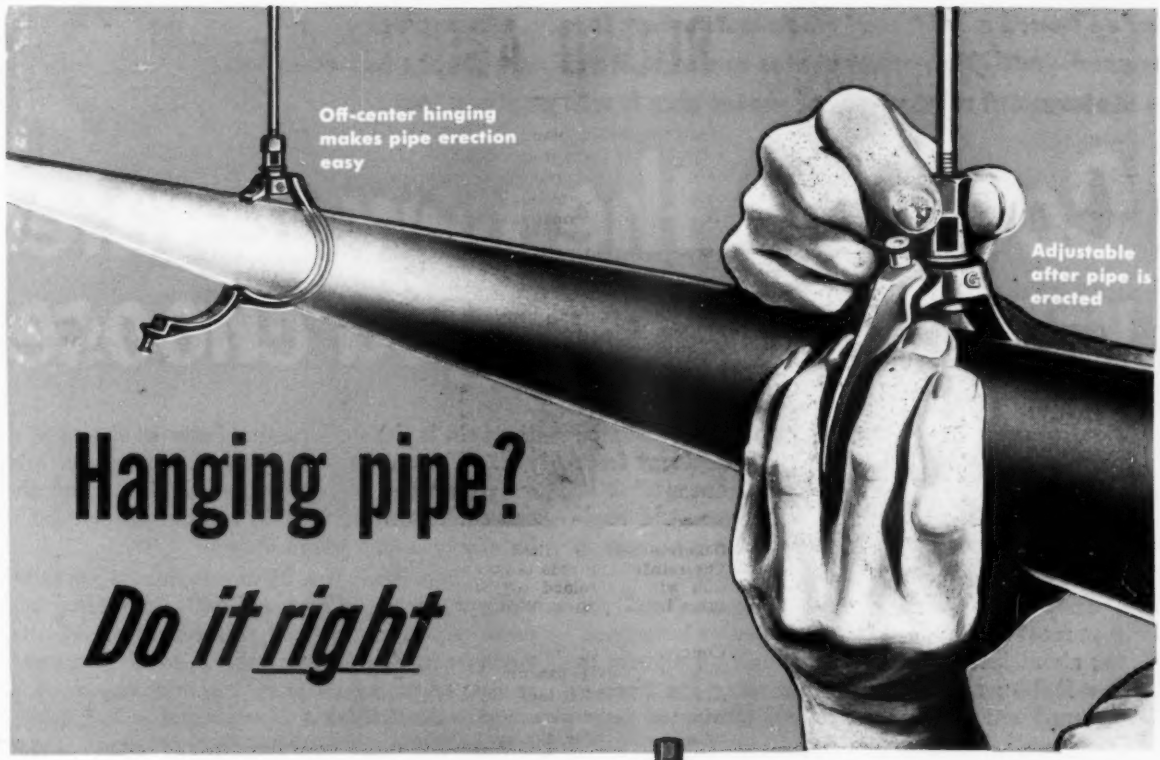
Lighting for Seeing

READERS DESIRING to study further in the general field of lighting for seeing in industry, presented by Leonard V. James, in the January, 1953 issue of PLANT ENGINEERING in his series on industrial lighting, should be advised that much of the fundamental research work referred to was done under the direction of Dr. Matthew Luckiesh.

Dr. Luckiesh, 21175 Shaker Boulevard, Cleveland, Ohio, who is now an independent and well-known consultant on lighting and the visual environment, was for many years Director of the Lighting Research Laboratory of the Lamp Division of General Electric Co., at Nela Park, Cleveland, Ohio.

He was and is now recognized as a principal leader in this important field of lighting environment and seeing and has contributed numerous articles in professional magazines and papers before technical societies, plus a considerable number of books on the subject. Among the latter which have appeared in recent years are *Light, Vision and Seeing* ($4.50) and *Reading as a Visual Task* ($5.00), both published by D. Van Nostrand Co., New York, N. Y.

▶ The article mentioned above was the first of a series of 12 articles prepared by Leonard V. James. A reprint of this complete series of articles is still available to readers at a cost of $1.00 per reprint.—*Editors.*



Hanging pipe?

Do it right

There's a stock Grinnell hanger for every piping requirement

SAVE MONEY ON ASSEMBLY. Cut installation time, get better, stronger installations, with Grinnell adjustable pipe hangers and supports.

NO SAG . . . NO WATER TRAP. Grinnell hangers permit adjustment after pipe is installed. This makes it possible to prevent sagging pipe and water traps, and assures positive drainage for the entire system.

FOR EVERY INSTALLATION. There is a stock Grinnell hanger for every need from simple water pipe to high pressure, high temperature steam line. Where necessary, there is a hanger to compensate for thermal movement.

PLAY SAFE. Don't waste time or take chances on inadequate pipe hangers and supports. All Grinnell hangers comply with rigid piping code requirements.

Enlarged section showing locking feature

GRINNELL ADJUSTABLE SWIVEL PIPE RING
(Split Ring Type)

- Hinging of ring is off-center. This provides sufficient seating to hold pipe before closing ring. Wedge-type pin is loosely but inseparably cast into the hinged section for fastening after pipe is in place.
- To obtain proper adjustment, swivel shank can be turned easily by hand when the weight of the pipe is temporarily taken off the ring.
- When weight is returned, patented swivel shank locks automatically, preventing change of adjustment due to vibration. Wire retaining ring keeps swivel shank and pipe ring or yoke from separating, makes assembly a single unit.
- 12 sizes have load range of 80 lbs. for ¾" size to 1510 lbs. for 8" size. May be used in connection with practically any building attachment.

GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports
Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems

For more facts circle 505 on Reply Card

You've heard a lot about re-rated motors lately. It's a great step forward—and, like other motor makers, Robbins & Myers has re-rated its motors. But regardless of motor size it will pay you to...

Compare the new re-rated motors before you choose!

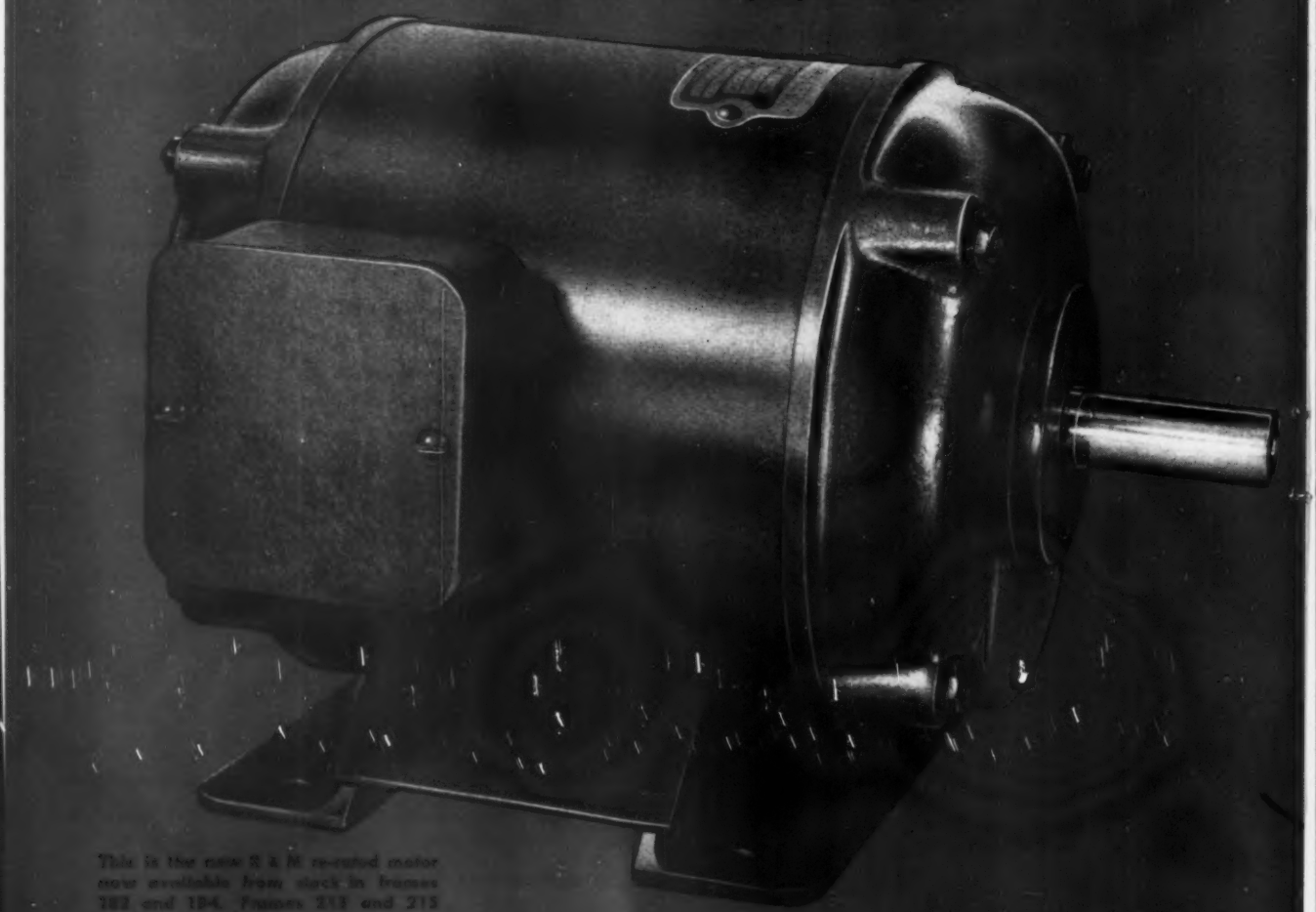
Before you make up your mind about re-rated motors, let's see what makes them different from the old frame sizes. New electrical concepts? Not at all! The principal difference is *size*. And engineers have known for years that it takes no special treatment to reduce the size of a motor.

That's why we invite you to compare. You'll see that most of the "new" features you've been reading about lately have been available for years in the Robbins & Myers motor. For instance—screened end-head openings, pre-lubricated bearings, full-height, protective end-heads.

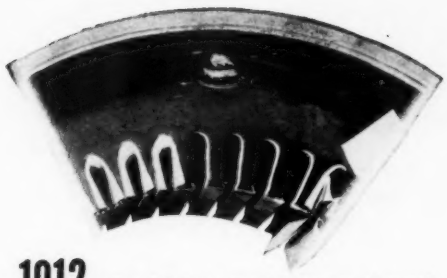
The main reason why R & M motors still lead the field is the construction features shown at the right. These are the things that can make or break a motor when it gets into your plant. And their early adoption by R & M has *consistently* led the industry, as the record shows.

Many of these R & M developments are now in widespread use, of course. That's not a complaint; we're proud of it! But this record of advanced engineering does suggest one thing: *if you want to be sure of getting the latest motor developments, investigate the Robbins & Myers motor.*

Write today for your free copy of bulletin 400 PE. It will give you more details.

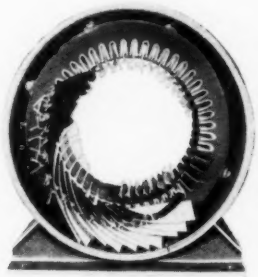


This is the new R & M re-rated motor now available from stock in frames 182 and 184. Frames 213 and 215 will be available in early June.



1912—R & M first to adopt pear-shaped slot cells, allowing more room for copper.

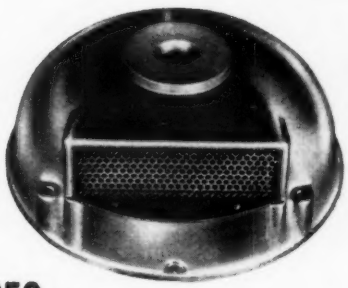
1939—R & M first to make pre-lubricated, sealed ball bearings available on standard integral horsepower motors. Even today R & M gives you the largest bearings for any given shaft diameter!



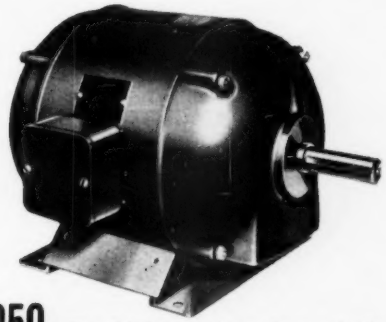
1940—R & M first to insulate between all coil ends, not just phase groups. This gives you 3 to 4 times greater insulating value, and it's still exclusive with R & M.

1944—R & M first to provide cast-iron, full-height end-heads; internal parts are accessible only from below.

Only R&M has given you ALL these features!



1950—R & M first to screen end-head openings at no extra cost. Screened openings keep out debris and rats. (Don't laugh: rodents are a real problem in many places!)



1950—R & M first to introduce a truly "weatherized" motor for industry-wide use, indoors as well as out. All motor parts are protected—inside and out—against moisture and dampness.

If it's an R&M it's the Right Motor!

ROBBINS & MYERS, INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO

Fractional & Integral h.p. Motors & Generators

Electric Fans

Electric & Hand Hoists & Cranes

Moyno Pumps

Propellair Industrial Ventilating Equipment

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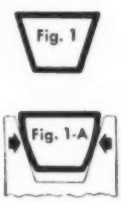
if you want lower V-Belt costs—

When a V-Belt bends, you can feel its sides change shape.

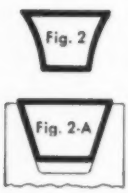
just make this simple test



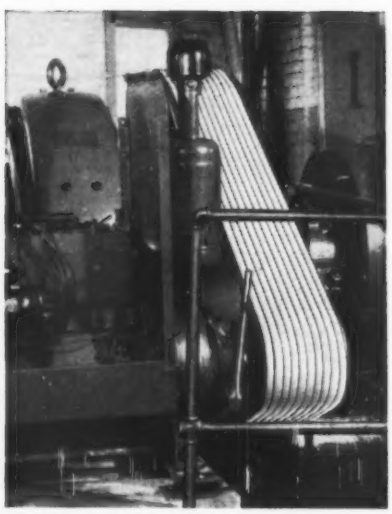
Take *any* V-belt that has *straight* sides (Fig. 1). Bend that V-belt while you grip its sides with your fingers. You will *feel* the sides *bulge out* (Fig. 1-A). Clearly, that out-bulge forces the belt to press *unevenly* against the V-pulley—and this *concentrates* wear at the points shown by arrows (Fig. 1-A).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

(U.S. PAT. NO. 1813698)



Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* and become perfectly straight. This belt, when bent, *precisely fits* its sheave groove (Fig. 2-A). The sides of the Gates Vulco Rope press *evenly* against the V-pulley. Therefore, wear is distributed *uniformly* across the *full face* of this belt —resulting in *longer* belt life and *lower* belt *costs* for you!



Typical Gates Vulco Rope Drive —the Gates V-Belts are built with Concave Sides to insure longer belt wear.

When you buy V-belts, be sure to get the V-belt with the Concave Sides—the Gates Vulco Rope!

Gates VULCO ROPE DRIVES

REG U.S. PAT. OFF.

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

THE GATES RUBBER COMPANY
DENVER, U.S.A.

CO-54

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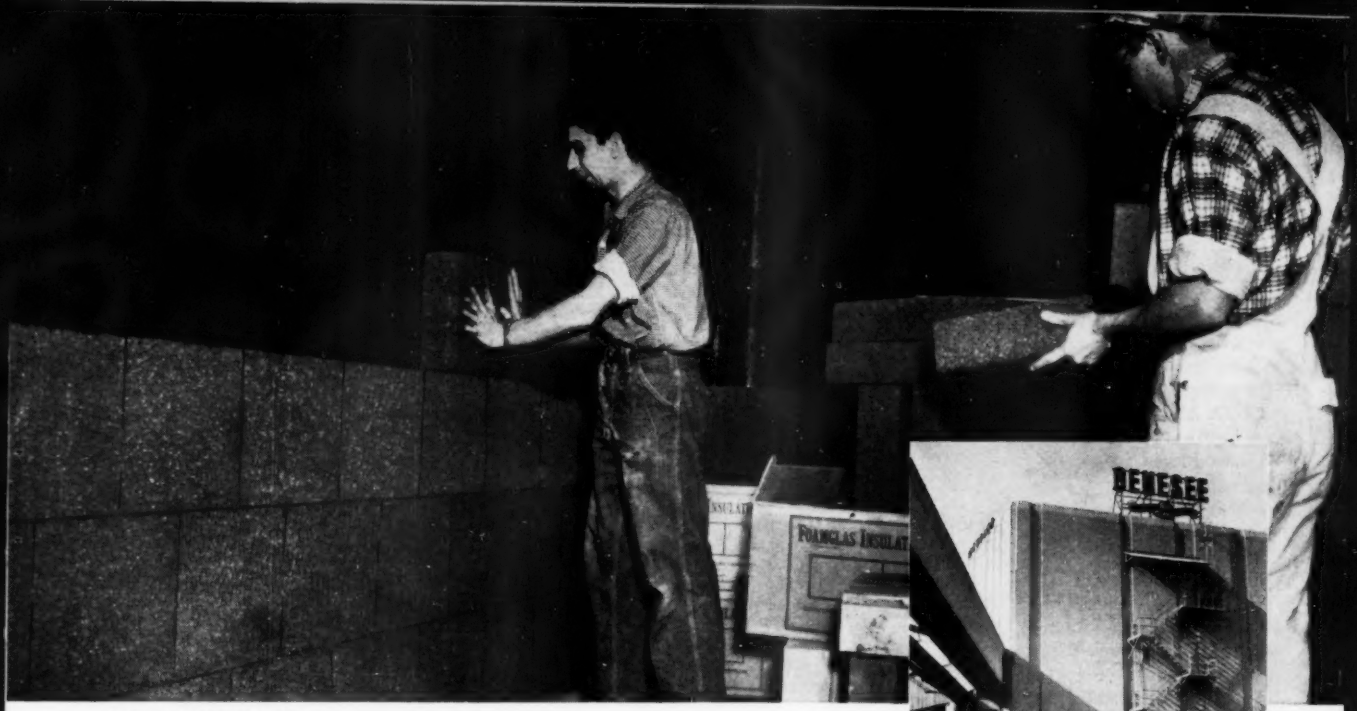


Lightweight FOAMGLAS blocks are easily installed on walls of Genesee's new storage building.

Exterior of Genesee Brewing Company's new four story storage building, built in 1950 of concrete block construction. All insulation is FOAMGLAS . . . on exterior walls, roof plus an insulated fermenting room inside.

"We insulate with FOAMGLAS because it stays dry!"

states Lloyd B. Welch, Plant Engineer, Genesee Brewing Company

Mr. Welch points to one of many spots at which old insulation failed completely.

"FOAMGLAS plays a leading role in our plant expansion program because it *stays dry* to maintain constant insulating efficiency," reports Lloyd B. Welch, plant engineer at Genesee Brewing Company, Inc., Rochester, N.Y. "The strong, rigid, cellular glass blocks of FOAMGLAS enable us to use them in *free standing* construction permitting use of our insulated spaces while other construction work is still in progress."

Mr. Welch continues: "Our old insulation absorbed moisture and failed, but this presents no problem with FOAMGLAS which is impervious even to the heavy vapor concentration in the fermenting room of our storage building. There FOAMGLAS helps us maintain desired temperatures (generally 33° F.) with minimum maintenance to equipment and structure.

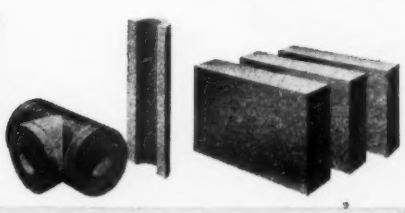
"With FOAMGLAS giving complete satisfaction in one storage building and a hops storage room, we'll definitely use it in a new storage building to be erected soon. We will continue to take full advantage of outstanding benefits from FOAMGLAS."

You, too, can do a better insulating job with moisture-proof, rat-proof, fireproof FOAMGLAS, the strong, rigid insulation that will give you long-lasting insulation service *plus* unique design advantages. Send now for our new booklets describing the use of FOAMGLAS for roofs, walls, ceilings, floors, piping and equipment. Write indicating your specific interest, to Department PE-44.

PITTSBURGH CORNING CORPORATION • One Gateway Center • Pittsburgh 22, Pa.

FOAMGLAS®

the cellular, stay-dry insulation



PITTSBURGH PC CORNING®

Pittsburgh Corning also makes PC Glass Blocks

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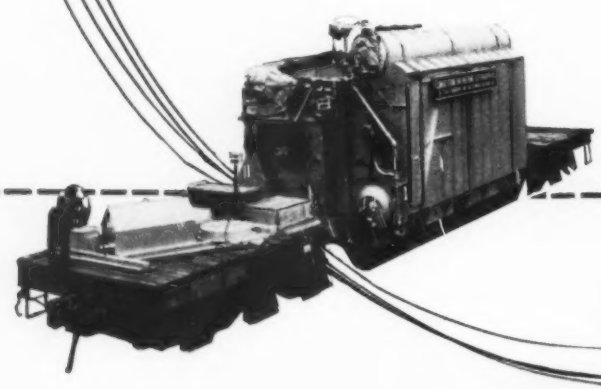
Who's buying VP boilers?

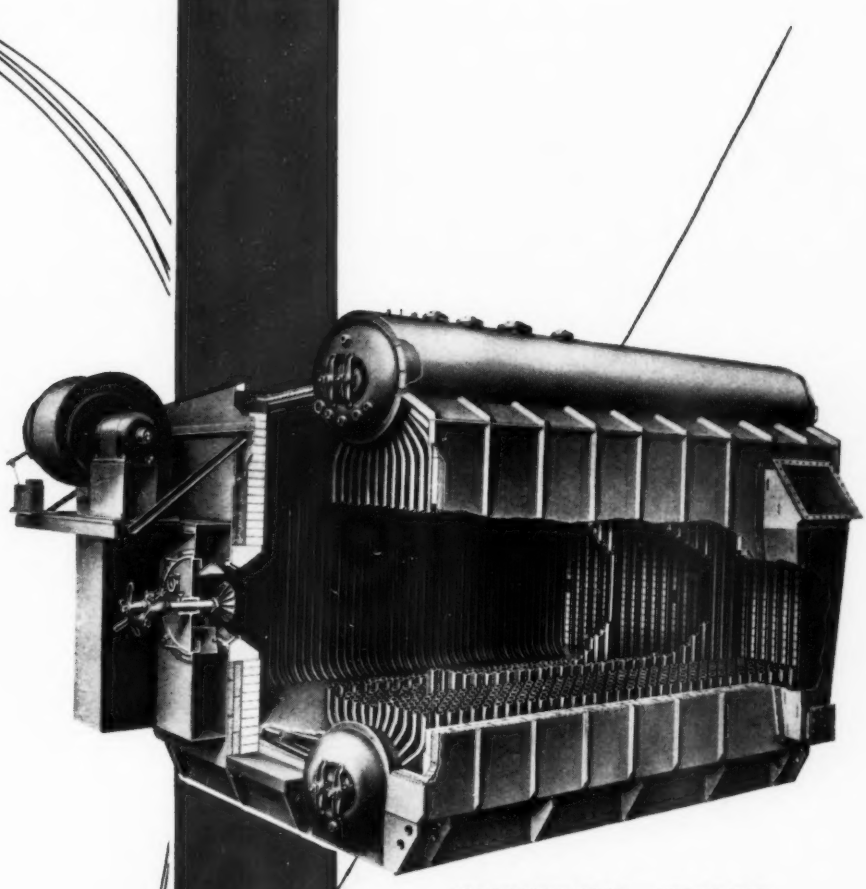
A quick perusal of the list on the opposite page indicates that, varietywise, almost everyone is. Big companies and small companies representing many industries . . . chemical, paper, textile, petroleum, foods, metals, etc. — utilities, hospitals — even the Atomic Energy Commission — have purchased one or more C-E Package Boilers, Type VP.

There's significance in that fact for you. It's quite likely that all of these buyers knew that there are many "package" boilers on the market. They probably knew, too, that most of them *look* pretty much alike. But they *bought* the VP — the package boiler with *extra* features. Could be that they liked the idea, too, of buying a *small* boiler from the same company that has designed and built many of the *largest* boilers in the world.

Why not look into this VP Boiler and its *extra* features? Let us send you Catalog VP 103 which describes it in detail. B-712C



C·E



SPECIFICATIONS — VP BOILER

Capacity	4,000 to 30,000 pounds of steam per hour
Pressures	Up to 250 pounds per square inch
Temperature	No superheat
Fuel	Oil or gas
Erection	Completely shop-assembled
Foundation	Simple concrete slab

RECENT PURCHASERS OF VP BOILERS

Acabados Textile Company
Aceitera "La Gloria", S. A.
Albemarle Paper Co.
American Bitumuls & Asphalt Co.
American Woolen Co.
Ames Textile Corp.
Anaconda Aluminum Co.
Ashland Oil & Refining Co., Inc., The
Bell Telephone Laboratories, Inc.
Brackenridge Hospital
Cabin Crafts, Inc.
Cardinal Glennon Memorial Hospital
Central of Georgia Railway Co.
Colonial Print Works, Inc.
Commonwealth Edison Co.
Comp. Hulera Euzkadi, S. A.
Consolidated Bleaching Company
Container Corp. of America
Dixiana Mills, Inc.
Du Pont de Nemours & Co., Inc., E. I.
Erie Railroad Company
Federal Sweets & Biscuit Co., Inc.
Ferro Stamping Company
Gaylord Container Corp.
General Motors Interamerica Corp.
Gulf Menhaden Company
Hockmeyer Brothers, Inc.
Liquid Carbonic Corp.
Long Island Railroad Co., The
Marinette Paper Co.
Mathieson Alabama Chemical Corp.
Mead Corp., The
National Biscuit Company
Negociacion Fabril de Soria, S. A.
New York Central System
New York Life Insurance Co.
Omaha Public Power District
Orangeburg Manufacturing Co.
Pan American Refining Corp.
Phelps-Dodge Corporation
Ponce Hospital Center
Smith, Inc., J. Howard
Southern Cotton Oil Co.
Standard Oil Co. of British Columbia
Stocker Manufacturing Company
Sure-Seal Corp., The
U. S. Atomic Energy Commission
Vulcan Detinning Company
Waterfalls Tissue Corp.
Whitaker Cable Corp.

COMBUSTION ENGINEERING

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.

BOILERS, FUEL BURNING AND RELATED EQUIPMENT; PULVERIZERS; AIR SEPARATORS AND FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

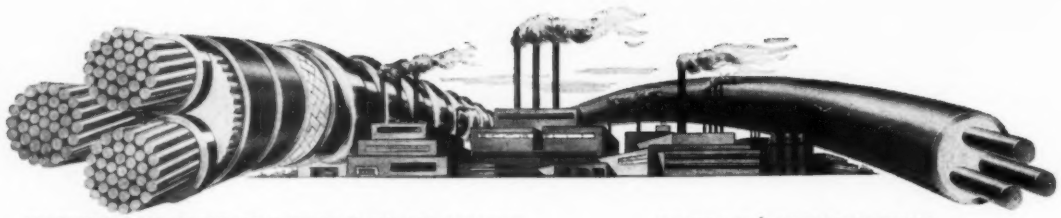
For more facts circle 509 on Reply Card

GENERAL CABLE

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

POWER TWINS

...Newest, Most Practical Team for Plant and Equipment Wiring



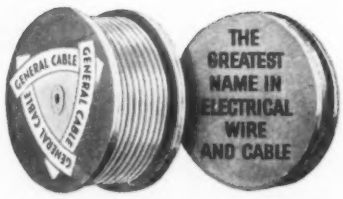
VARNISHED CAMBRIC OR RUBBER INSULATED CABLES

SAFETY m.i. WIRING SYSTEMS

The famous Power Twins combine lower installed costs with unique adaptability. They are ideal for electrical wiring without conduit in close areas and under, down and around beams and pillars...where power needs vary... where plant layout presents difficulties.

Varnished Cambric or Rubber Interlocked Armor Cable is designed for both low and high voltage requirements, (lighting and power control) and is available with steel, bronze or aluminum armor.

Safety m.i. Wiring System, all mineral insulated and exclusive with General Cable, is ideal for all applications up to 600 v. where heat, vapors, moisture, aging are of particular concern. Lower installed cost! Small diameter saves space! Trains easily for neat, compact installation. Investigate this popular combination before you buy. They can save you time and money.



BARE, WEATHERPROOF, INSULATED WIRES and CABLES FOR EVERY ELECTRICAL PURPOSE

GENERAL CABLE CORPORATION

420 Lexington Avenue, New York 17, New York • Sales Offices: Atlanta • Buffalo Cambridge (Mass.) • Chicago • Cleveland • Dallas • Detroit • Greensboro, N. C. • Indianapolis • Kansas City • Los Angeles • Milwaukee • Houston Minneapolis • Newark (N. J.) • New York • Philadelphia • Pittsburgh Portland (Ore.) • Rossmoyne, Ohio (Cincinnati area) • St. Louis • San Francisco • Seattle • Syracuse • Tulsa • Washington, D. C.

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For more facts circle 511 on Reply Card →

SQUARE D SAFETY SWITCHES

—Never out of First Place in 50 Years!

COMPARE... line for line and feature for feature
THEY COST NO MORE... WHY SETTLE FOR LESS?

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

ship or store machinery?

Here's important news

Gulf Oilcoat T

prevents rust in lubricating systems
but does not contaminate lubricating oils

The compatibility of Gulf Oilcoat T with lubricating oils is of particular importance to you if the lubricating systems of your new machines are flushed with the same oil that is to be used for lubrication.

The use of a rust preventive that is not compatible may result in the development of harmful precipitates in the lubricating oil and considerably shorten its period of usefulness. Oils so contaminated may even cause machine parts to be damaged, thus increasing maintenance costs.

Several large machinery manufacturers have thoroughly tested Gulf Oilcoat T. They now use it extensively to protect the vital lubricating systems of their equipment against rust during shipment and installation.

Because of its light viscosity, Gulf Oilcoat T may be applied by spray, brush, dipping, or circulation.

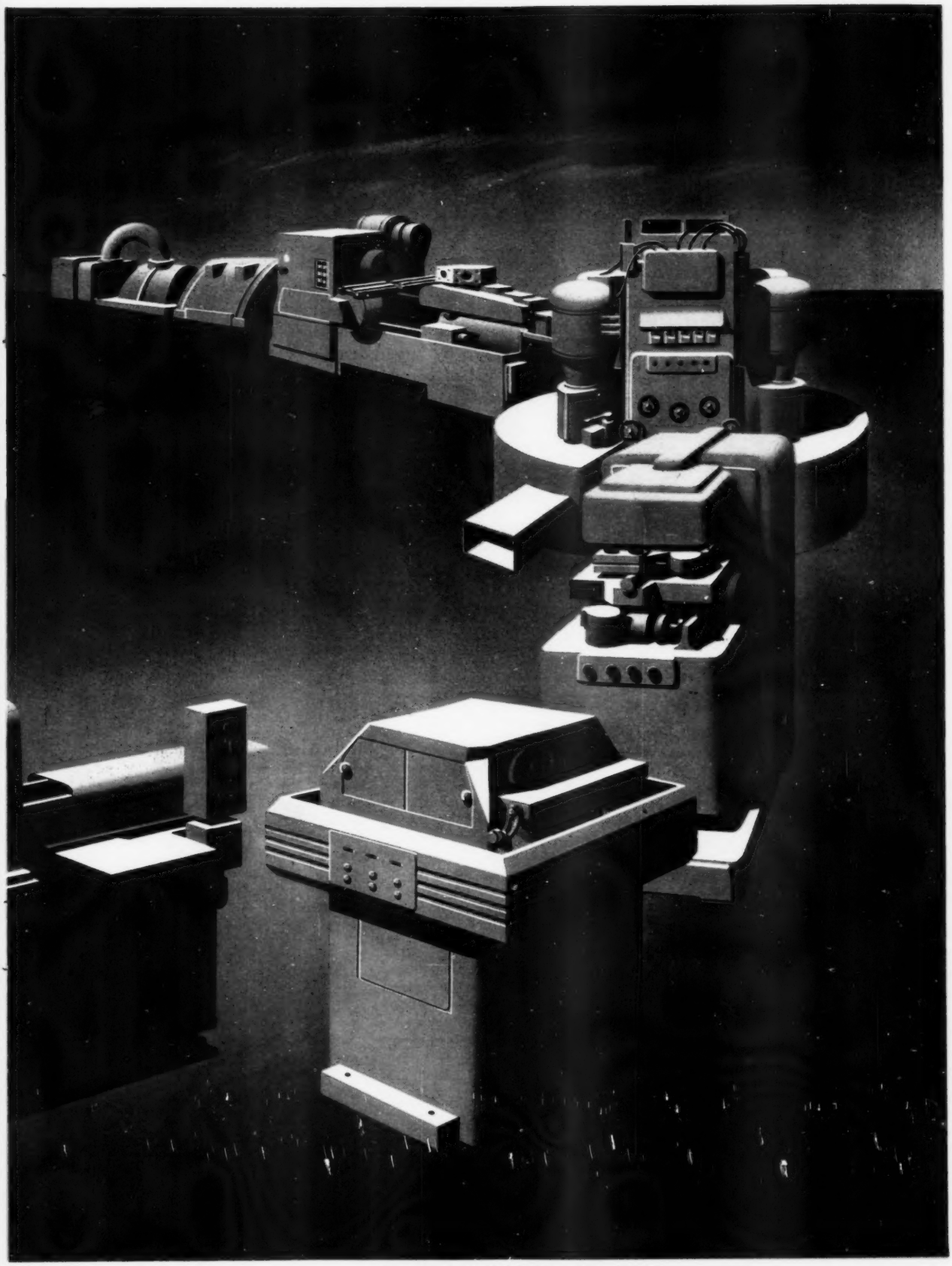
If you manufacture, ship, store, or seasonally shut down machinery that has a lubricating system, ask a Gulf Sales Engineer to explain in more detail the advantages of Gulf Oilcoat T. Contact your nearest Gulf office now, or send the coupon below.

GULF OIL CORPORATION · GULF REFINING COMPANY
1822 GULF BUILDING, PITTSBURGH 30, PA. PE

Please send me, without obligation, a copy of your pamphlet on Gulf Oilcoat T.

Name.....
Company.....
Title.....
Address.....

GULF SERVES INDUSTRY



NEW developments in air-line filters by NORGREN

• improved filtering and draining
• wider range of applications

Filtering air in lines leading to power tools, cylinders and other air-operated equipment is essential for proper operation of the equipment and minimum maintenance costs. Norgren Filters have been used as standard by hundreds of manufacturers for efficient removal of corrosive moisture and abrasive foreign matter.

Now, Norgren has made additional mechanical refinements for even better filtering action...has extended the line to cover more applications.

Model 11,200-2

Automatic-Drain Filter, transparent bowl. Flow: 0 to 35 cfm; pressure: 30 to 150 psi; temperature: 40° to 120° F. Choice of 3 filter elements: 200 mesh (74 micron) monel screen, 25- and 64-micron sintered metal. Drain operates automatically under constant or fluctuating air pressure, with or without air flow.

Transparent bowl filter, ¼" and 1" Flow: 0 to 140 cfm; pressure 0 to 150 psi; temperature; 40° to 120° F. Choice of 3 filter elements: 200 mesh (74 micron) monel screen, 25- and 64-micron sintered metal.

Model 22B-6

Transparent bowl filter, ¼" and ⅜" Flow: 0 to 30 cfm; pressure: 0 to 150 psi; temperature 40° to 120° F. Choice of 3 filter elements: 200 mesh (74 micron) monel screen, 25- and 64-micron sintered metal.

Model 12,200-2 (64)

WRITE, NOW, FOR CATALOG SHEETS

C. A. Norgren CO.
3443 So. Elati, Englewood, Colo.

PIONEER AND LEADER IN OIL-FOG LUBRICATION FOR 25 YEARS

• VALVES • FILTERS • LUBRICATORS • REGULATORS • HOSE ASSEMBLIES

For more facts circle 513 on Reply Card

Here's a One-Man Bulk Materials Handling System for Your Plant...

In the Dempster-Dumpster System of bulk materials handling only one man, the driver of the truck-mounted Dempster-Dumpster, is required for operation. The Dempster-Dumpster serves scores of detachable Dempster-Dumpster Containers. Container capacities range up to 4 times that of conventional dump truck bodies and each container is designed to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. You simply place these containers at convenient materials accumulation points inside or outside buildings. When loaded each container is picked up, hauled and emptied (as shown above) or load set down intact. Entire operation is handled by hydraulic controls in cab.

Containers shown below are just a few of the many available or that can be built to meet your needs. They enable you to handle, at tremendous savings, materials of many descriptions—trash and waste materials, raw materials, finished products, etc. —with only one truck and only one man, the driver.

Without question, the Dempster-Dumpster System is the most economical and most efficient method of plant materials handling by truck ever devised!

Write to us for complete information. Manufactured exclusively by Dempster Brothers, Inc.

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes

DEMPSTER BROTHERS, 144 Shea Bldg., Knoxville 17, Tennessee

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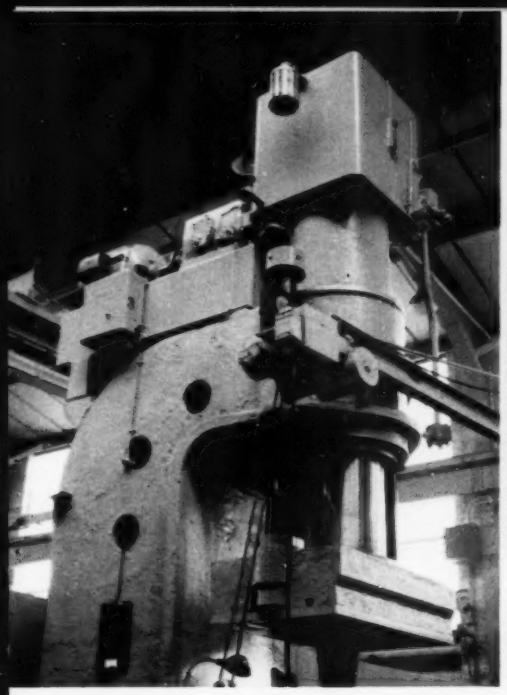
For more facts circle 515 on Reply Card →

STOP RUST!

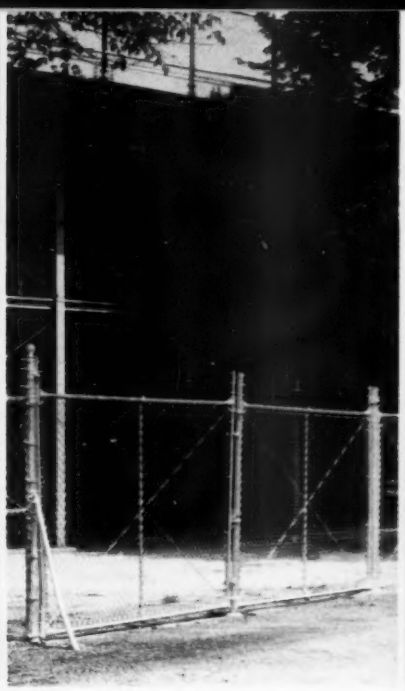
with

RUST-OLEUM®

Get Rust Prevention and Decorative Beauty
In One With Colorful Rust-Oleum Finishes

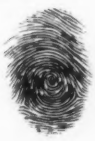


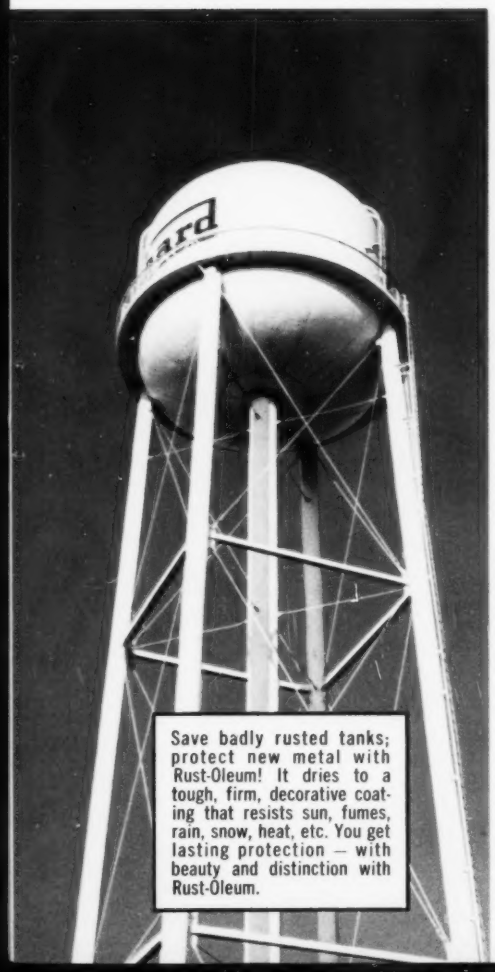
Rust-Oleum Grandeur Gray beautifies and protects this huge Hydraulic Press at The Frank G. Hough Co. in Libertyville, Illinois. Use Rust-Oleum's wide variety of colors to keep your plant machinery and equipment looking its best —and to provide Soothing, Restful Colors for pleasant working conditions.



Beautify as you protect your wire fences with Rust-Oleum. Use Rust-Oleum's Extra-Long Nap Lamb's Wool Roller (not just an ordinary roller—but a special fence tool) and save up to 40% on re-coating costs.

Pipes, pumps, etc. above and below ground need Rust-Oleum protection to resist moisture, condensation, heat, fumes, salt water, salt air. Use colorful Rust-Oleum coatings to identify pipelines, conduits.

There's only one Rust-Oleum.  *It is distinctive as your own fingerprint.*



Save badly rusted tanks; protect new metal with Rust-Oleum! It dries to a tough, firm, decorative coating that resists sun, fumes, rain, snow, heat, etc. You get lasting protection — with beauty and distinction with Rust-Oleum.

Think of all the money-saving ways to use Rust-Oleum's brilliant array of finish colors to beautify as you protect! Rust-Oleum's *exclusive* formula incorporates a specially-processed *fish oil vehicle* that is *odor-free* and dries to a tough, decorative finish that resists rain, sun, fumes, heat, snow, condensation, salt water, salt air, etc. If your metal surfaces are already rusted, use Rust-Oleum 769 Damp-Proof Red Primer to penetrate rust to bare metal —saving time, labor, and money on your tanks, stacks, fences, boilers, metal sash, machinery, girders, beams, gutters, roofs, pipes, etc. Follow-up with a Rust-Oleum finish coating in your desired color to beautify as you protect. From Primers, Finish Coatings, Machinery and Implement Finishes, Heat Resistant and Chemical Resistant Coatings to the wonderful new Rust-Oleum Restful Color Group for soothing, pleasant color control for plant interiors and machinery—you'll get both *Rust Prevention* and *Decorative Beauty* in *one* with Rust-Oleum. See Sweets for our complete catalog and nearest Rust-Oleum Industrial Distributor, or clip coupon to your letterhead.

See your local classified telephone directory under Rust Preventives or Paints for your nearest Rust-Oleum source of supply

Give your trucks, construction and materials handling equipment, etc. that smart, "top condition" appearance with Rust-Oleum—and resist road grime, salt, dust, weathering. Rust-Oleum colors match such original equipment manufacturers as Allis-Chalmers, International Harvester and many others.

ATTACH TO YOUR LETTERHEAD — MAIL TO
THE RUST-OLEUM CORPORATION
2799 OAKTON ST., EVANSTON, ILLINOIS

I want to know more about RUST-OLEUM. Send me without obligation a FREE sample. I intend to test it ☐ indoors; ☐ outdoors; on ☐ wood; ☐ rusted metal; ☐ clean metal; ☐ brick; ☐ concrete; ☐ stucco;

.....

(State on the above line object or structure such as tractor, tank, fence, metal sash, roof, floors, walls, etc.)

Subject to special conditions: ☐ weather; ☐ humidity; ☐ fumes; ☐ brine; ☐ dampness.

☐ I have a chain-link fence. Please send full information on RUST-OLEUM's new Roller Method that cuts re-coating costs.

☐ Send Complete Catalog with Color Guide

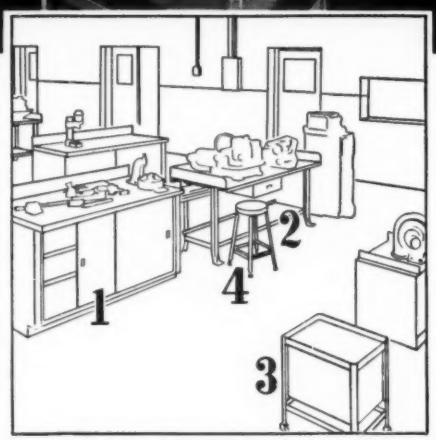
Please be sure to Indicate Color Preference Here

☐ Have Qualified Representative Call _____

NOTE: We want to supply you with the correct sample for your test. Please be sure to check off all appropriate information about your problem.

MODERNIZING YOUR LAB?
Fit it up FAST and at LOW COST
with standard HALLOWELL Shop Equipment

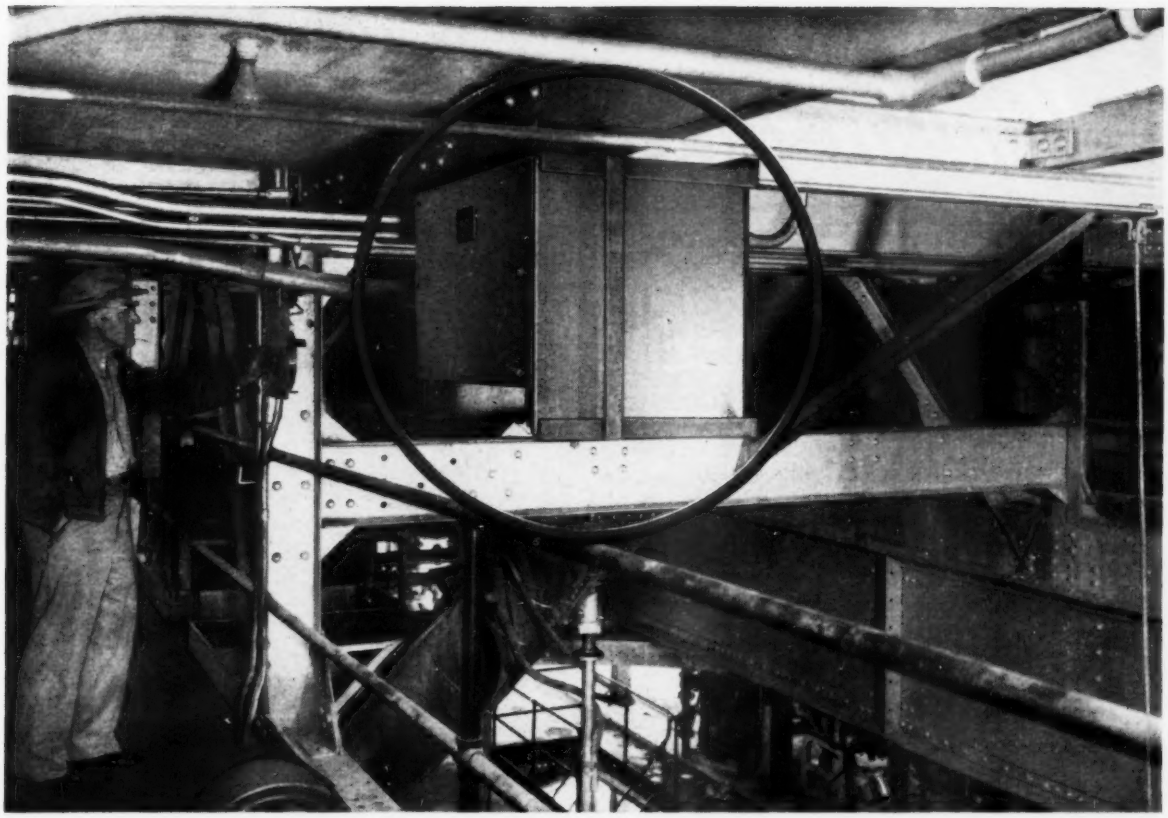
Your HALLOWELL distributor will be glad to give you the latest product information and help you select the best combination to fit your requirements. And because he carries a complete stock of this standard, interchangeable equipment, he can save you time and money. For more information, consult him or write STANDARD PRESSED STEEL CO., Jenkintown 26, Pa.



1. Cabinet Benches
2. Work Benches
3. Tool Stands
4. Stools and Chairs

HALLOWELL® SHOP EQUIPMENT DIVISION SPS JENKINTOWN PENNSYLVANIA

For more facts circle 516 on Reply Card



60-kvar capacitor unit shown above is part of the 600-kvar installation that permitted a 10% increase in load.

Capacitors can be put in out-of-the-way places—such as on these existing horizontal I-beams to conserve space.

Seriously overloaded circuits take on 10% more load after G-E Capacitors are added

American Crystal Sugar Co. profits from an emergency that arose during a recent sugar refining "campaign."

During a sugar beet "campaign" which lasts from July to December, the American Crystal Sugar Company of Clarksburg, California, operates 24 hours a day. Shutdowns mean costly financial losses.

That's why the company really had an emergency on its hands when its electrical facilities became seriously overloaded in a recent campaign. However, the solution was simple. A call to G.E. brought 600 kvar of capacitors to the plant in time to prevent a "burnout."

A short time after the order was placed, the capacitors were installed and in operation. The plant's power factor climbed from 86% to about 97%. This relieved the overloading—*and released enough capacity to handle a subsequent 10% increase in load!*

CAPACITORS HAVE MANY USES

They can often free distribution facilities to carry 20 to 30% more load. Where voltage drop is a problem, capacitors can provide the needed voltage boost inexpensively. And if your power factor is below 85%, and you have a power-factor or kva-demand clause in your contract, they can usually cut your power costs.

For more information, see your local G-E Apparatus sales office, or authorized G-E agent or distributor. Or write to Section 407-209 for booklet GEA-5632—"How to Reduce Power Costs and Gain System Capacity." *General Electric Company, Schenectady 5, New York.*

You can put your confidence in—

GENERAL ELECTRIC

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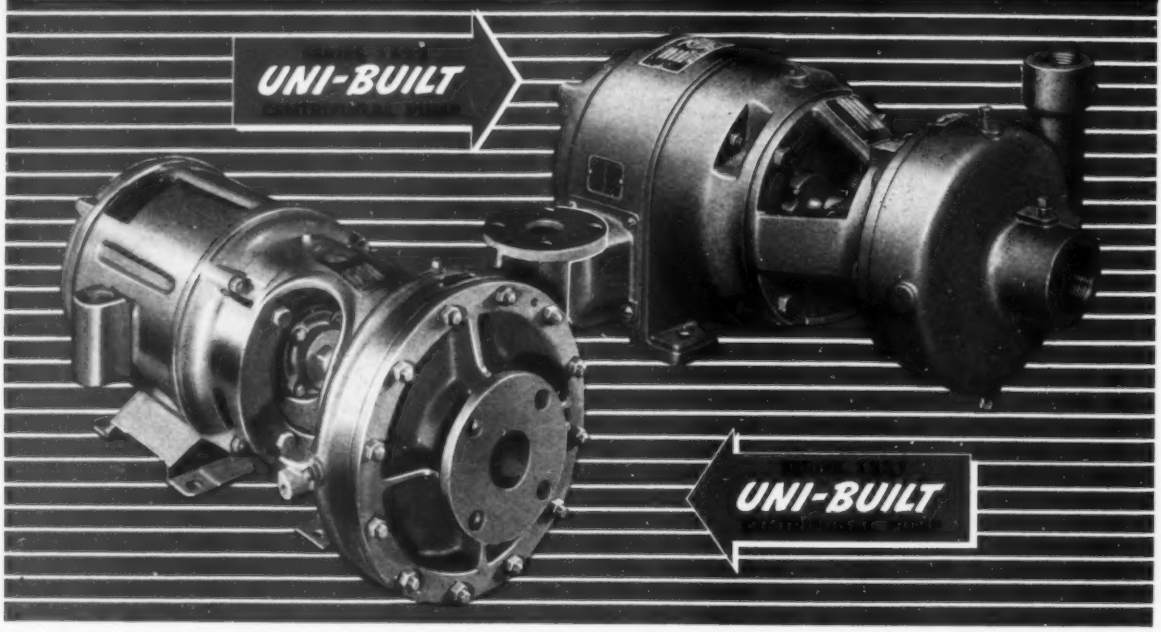
NO WAITING . . .

Popular sizes carried in stock!



Sizes, capacities and prices on B & G Series 1522 and 1531 Stock Pumps are given in a bulletin available upon request. Send today for your copy.

B & G manufactures a comprehensive line of Hydro-Flo Centrifugal Pumps and Heat Exchangers for industrial applications. Send for catalogs.

These are *the* pumps which stand up under hard service in industrial plant applications! For your convenience, a stock of most commonly used sizes is maintained at the factory—ready for immediate shipment.

The leak-proof "Remite" Mechanical Seal alone makes these pumps a *buy!* This new-type Seal is harder than glass—wear-proof, corrosion-resistant. It's self-lubricating and eliminates the usual leakage through the packing gland—assures trouble-free operation.

Smooth running . . . quiet!

Oversize bearings hold the shaft in alignment for smooth, quiet performance...balancing of the impeller prevents shaft vibration and seal failure. All parts are machined to rigid specifications, carefully inspected and assembled—assurance of minimum installation and maintenance expense. B & G Series 1522 and 1531 Pumps kept in stock at the factory are bronze-fitted only, but are available as all-iron, all-bronze or stainless steel units.

With all these advantages, you'll find them competitively priced!

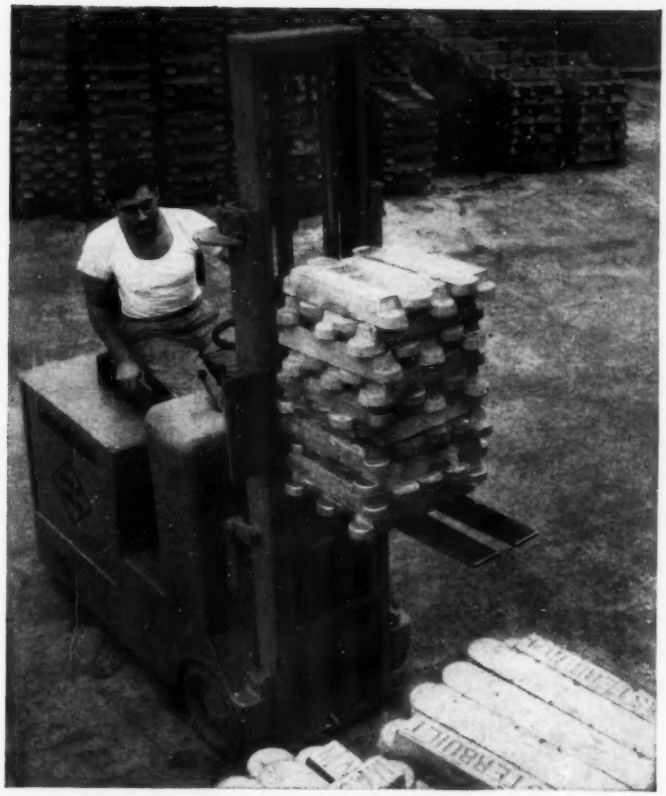
BELL & GOSSETT
COMPANY
Dept. DJ-53, Morton Grove, Ill.

Canadian Licensee: S. A. Armstrong Ltd., 1400 O'Connor Drive, Toronto, Canada

For more facts circle 518 on Reply Card

B.F.Goodrich

FREE TW TIRE AND WHEEL ANALYSIS can cut your tire maintenance costs 20% or more

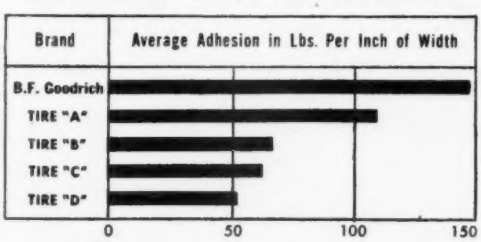


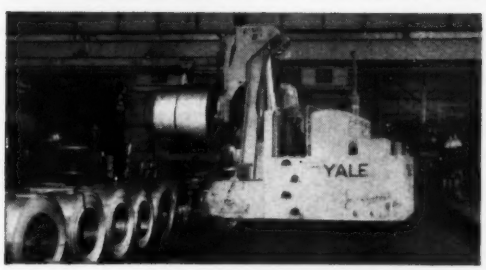
Tire maintenance costs cut 20%. Total tire costs lowered as much as 50%. Such savings have been reported by industrial tire users across the country through the use of the B. F. Goodrich Tire and Wheel Analysis Plan! Contact your local BFG retailer or mail the coupon below. Without cost or obligation, a trained B. F. Goodrich man will study your materials handling operations. He will tell you what type and size tires, what tread design and compound will serve you best.

The advice and counsel you get will be unbiased, for B. F. Goodrich makes a *complete* line of industrial tires. A special TW Analysis is available for manufacturers of industrial hauling equipment.

DO YOU HAVE THIS PROBLEM? Poor adhesion of rubber to steel caused this tire to fail prematurely. The chart below, based on extensive comparison tests of leading makes of tires, proves the superior adhesion qualities of BFG solid industrial tires.

Tests Prove B. F. Goodrich Adhesion Best





Heavy loads and equipment? Overloaded tires fail prematurely. Let BFG show you how to match tire and load.

Cutting and chipping? Rough hauling surfaces soon ruin tires. Your BFG man can show you how to get maximum tire life.

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Specify B. F. Goodrich tires when ordering new equipment

The B. F. Goodrich Company
Tire & Equipment Division
Department TW- **380,**
Akron 18, Ohio

Please send me:

- ☐ Additional information on your Tire and Wheel Analysis Plan
- ☐ Free copy of "Industrial Tire Guidebook"
- ☐ Free copy of "How to Get Extra Service out of Solid Industrial Tires"

Name_____

Company_____

Street_____

City_____ Zone____ State____

For more facts circle 519 on Reply Card

66% of the 75 largest U.S. manufacturing companies use ELWELL-PARKER trucks!

Here are reasons for this outstanding acceptance... You can benefit by them, too!

LOWER MAINTENANCE because E-P packaged unit design insures instant accessibility for preventive servicing. E-P Service Engineers make periodic calls to advise on maintenance and operation.

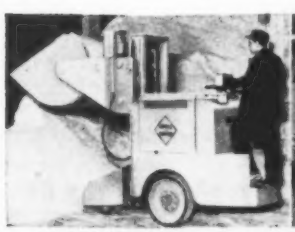
15 TO 20 YEARS RELIABLE SERVICE because Elwell-Parkers have more alloy steels and forgings, plus extra-reinforcement of critical parts to prevent excess wear or breakdowns.

RIGHT TRUCK FOR EACH JOB because Elwell-Parker supplies over 100 models and all types—low lift platform, high lift platform, fork trucks and cranes.

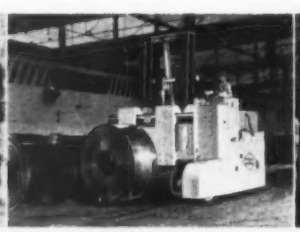
ENGINEERED UNITS FOR SPECIAL APPLICATIONS Elwell-Parker has *unmatched* experience in designing special trucks for unusual load or operating conditions.

Get the full story by writing for this catalog. The Elwell-Parker Electric Co., 4176 St. Clair Avenue, Cleveland 3, Ohio.

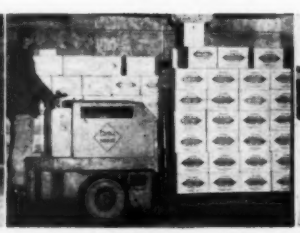
ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893



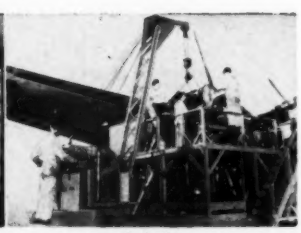
Chemical



Metal Producing

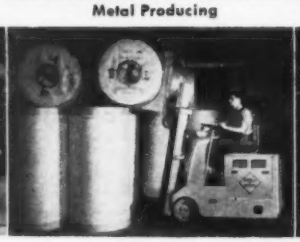


Food

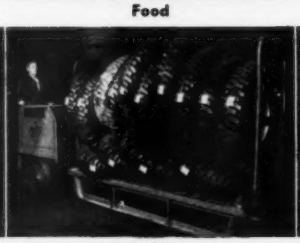


Aviation

Automotive



Paper

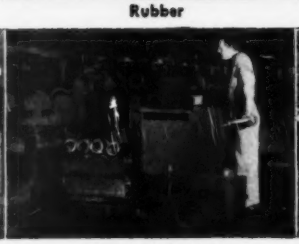


Rubber

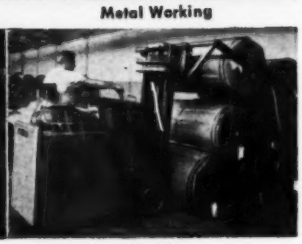
Metal Working

Refining

Machinery



Electrical Products



Textile

For more facts circle 520 on Reply Card

MIDGET SIZE Power Plugin

NOW AVAILABLE IN 100 AMPERE CAPACITY

with plug-in outlets on 12-inch centers

Add to the efficiency, economy, flexibility and convenience of plant operations by using this new system of power distribution for all small plant equipment — power tools, small machines and motors, return lubricating systems, production benches and machine illumination.

Redesigned to broaden its use through an increase of 66⅔ percent in its capacity and by closer spacing of outlets, the new Midget (FA) POWERPLUGIN Busduct provides "plug in and go" power for virtually every type of small equipment, affords substantial savings by eliminating long lead-ins with a resultant voltage drop, and makes it possible to move machines in and out of production lines without slowing down or delaying operations.

Approved by the Underwriters' Laboratories, Inc., for label service, the new Midget (FA) POWERPLUGIN is only 3½ inches wide and 2 inches deep in size. It is available in standard 5 and 10 foot lengths and can be arranged to fit almost any requirement. While standard sections have plug in outlets every twelve inches, additional outlets and special lengths are available on specific order.

Midget (FA) POWERPLUGIN is available in 100 amp., 250 volt feeder capacity for 2, 3 or 4 conductor solid neutral types for equipment requiring connections for ½ to 3 HP, 240 volt motors or less AC or DC and 7½ HP maximum for motors with dual element fuses. The 2 and 3 conductor types provide 220 volts single phase or three phase power to motors while the 4 conductor type provides single or three phase power for motors and 120 volts for machine illumination.

For additional information about this new and more efficient and flexible system of power distribution contact your nearest (FA) representative, listed in Sweet's or a (FA) distributor. Or send for Bulletin No. 720.

Frank Adam Electric Co.

P. O. BOX 357 • ST. LOUIS 3, MISSOURI

Makers of: BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER

For more facts circle 521 on Reply Card

STANDARDIZE!

ECONOMIZE!

with the bushing that's interchangeable

TAPER-LOCK

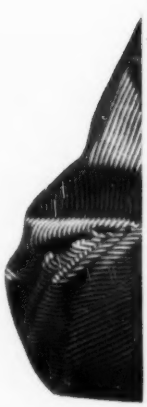
A PATENTED PRODUCT OF DODGE

Now mount 'em all—your sheaves, sprockets, couplings, conveyor pulleys —with Taper-Lock bushings. You'll save time, save money, and keep production rolling by standardizing on these interchangeable bushings.

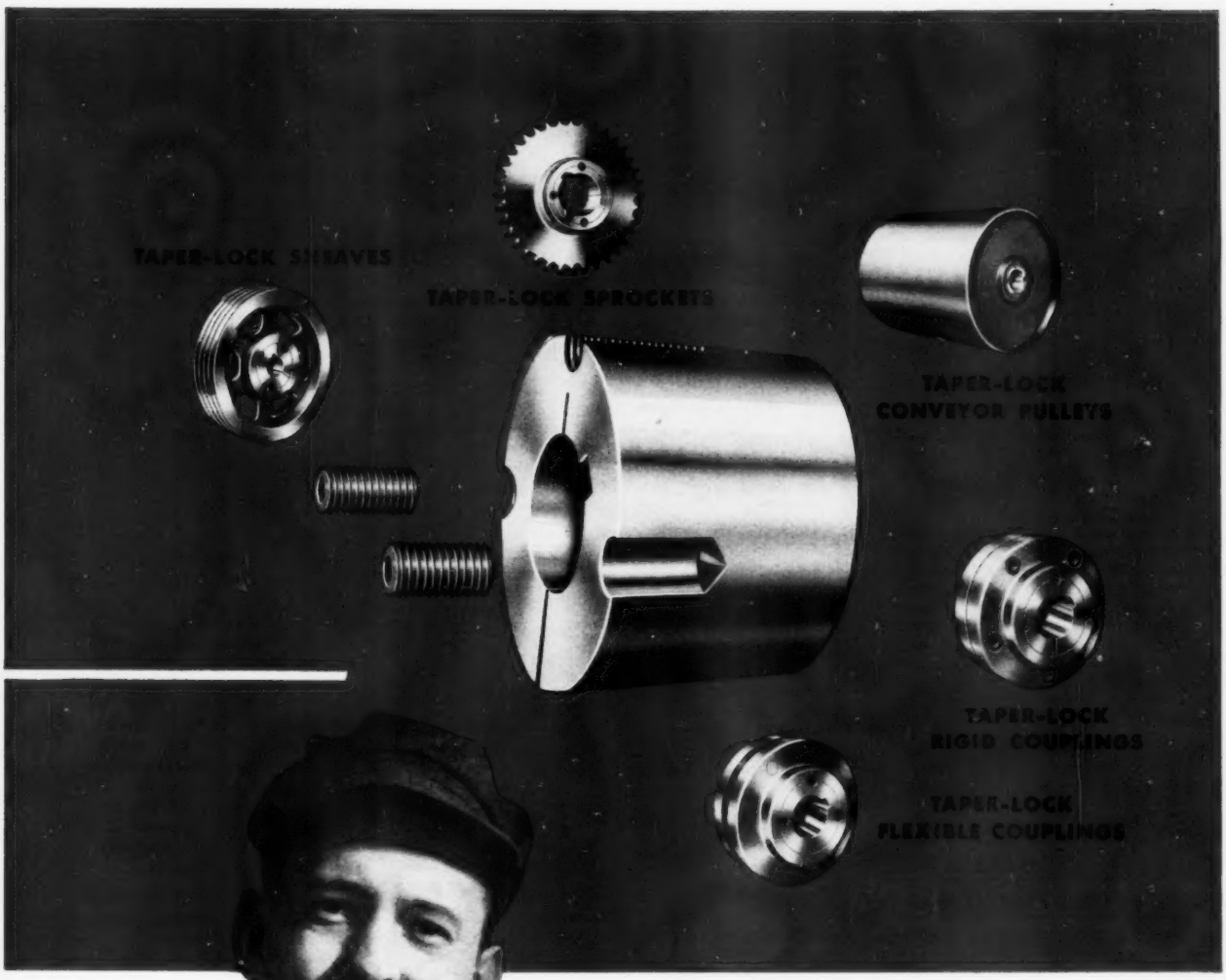
Taper-Lock, a patented product of Dodge, provides the simplest, surest means of mounting wheels on shafts. Dodge Taper-Lock products slip onto the shaft easily, quickly—hold with the firmness of a shrunk-on fit. They come off easily—no hammer, no crowbar, no shock to bearings or machinery.

Taper-Lock bushings fit in every one of the Dodge products pictured above. You can shift from a sprocket to a sheave, for instance, and use the same bushing. And Taper-Lock bushings are available in a range of sizes which makes changing from one size shaft to another equally easy and quick.

With a few Taper-Lock bushings you can make quicker changes and cut down-time on production machines. Get the facts now.



DODGE MANUFACTURING CORPORATION, 2700 UNION STREET, MISHAWAKA, INDIANA



THERE'S ONLY ONE TAPER-LOCK, THE BUSHING THAT MOUNTS FLUSH!

DODGE

→ of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor, for valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.

For more facts circle 522 on Reply Card

"NO SHUT-DOWNS WITH LUBRIPLATE"

—say HENRY & WRIGHT of Hartford, Conn.

"While waiting for delivery of one of our 25-ton Dieing Machines to do a particularly heavy job, a customer was trying to start production of a 10-ton machine. Even though it was lubricated with a conventional grease every eight minutes, the machine had to be shut down for bearings to cool during each coil run. Then, on our recommendation, he changed to a LUBRIPLATE Lubricant. With but two applications of LUBRIPLATE a day, the machine operated continuously except during change of coils."

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

For more facts circle 523 on Reply Card

BACKTALK about our past issues

Edited by R. L. Marinello

Non-Return Valve Takes Over

PLANT ENGINEERING:

"With regard to the article 'Emergency Breeds a Safety Device' in the November, 1953, issue, it is a government regulation in Britain that an air chuck must hold the work even if the air line pressure is destroyed completely.

"This is accomplished in a very simple manner by fitting a non-return valve into the gripping side of the chucks' air cylinder. The entrapped air thus holds the chuck jaws in the gripping position on the work. The operator is not aware that air line pressure has failed until he tries to chuck a new piece, when the jaw release will probably fail to work. Operators can finish a short job with no air line pressure.

"Long cuts on heavy work might result in a premature loss of chuck jaw pressure, owing to leakage in the air cylinder and non-return valve. In such circumstances, an audible whistle warning is fitted so that the operator can shut off the spindle power. With a cylinder in good condition, the chuck will hold for several hours after an air pressure line failure." *F. E. Riley, London, England.*

Seeks More Info on Air Drier

PLANT ENGINEERING:

"We refer to paragraph two, column two, page 95, of the article 'Compressed Air Survey Knocks Wind Out of Losses,' in the February, 1954, edition. In the paragraph to which we refer, mention is made of a Parkhill-Wade air drier for removing water content from compressed air.

"It is our wish to obtain descriptive literature, prices, etc., on such a unit; but a search of our manufacturers lists both by firm name and trade name does not supply us with an address to which such an inquiry can be addressed. Can you help us out by supplying this address? *R. E. Dando, Purchasing Department, Hazard Insulated Wire Works, Wilkes-Barre, Pennsylvania.*

► The address of the Parkhill-Wade Co. is 5017 East Anaheim, Los Angeles 22, California.—*Editors.*

Kansas City PE Club

PLANT ENGINEERING:

"This letter is written to give a more formal expression of our appreciation for the work which the Technical Publishing Co. has done to promote the organization of a representative group of Plant Engineers in this district and throughout the nation.

"We appreciate the amount of work, thinking and effort which were involved in preparation of the organizational outlines and other material which was furnished. It is certain that this effort has gone a long way toward removing the preliminary obstacles which might have hindered the formation of the group.

"We look forward with some pleasure to the prospect of working with the Kansas City Plant Engineering Club and with your organization in the future." *James L. Daly, Plant Engineer in Charge, Butler Manufacturing Co., Kansas City, Missouri.*

► An article covering the organizational meeting of the Greater Kansas City Area appears on page 115 in this issue.—*Editors.*

Fire at C & D Batteries

PLANT ENGINEERING:

"I want to both thank and congratulate you for the excellent article 'Three Days After Fire C & D Batteries Was Back in Business' in the February issue. You have told our story accurately and well, and your interpretation of the spirit which motivated our action is kind and generous.

"If they are available, we would like to have 100 to 200 reprints of this article for the information of our field organization. Could you have some member of your organization advise us if these are available, and their cost." *Samuel W. Gibb, Vice President, C & D Batteries, Inc., Conshohocken, Pennsylvania.*

► Our production manager will send you information on the cost of printing 100 to 200 copies of this article.—*Editors.*

Roster of Plant Engineers

PLANT ENGINEERING:

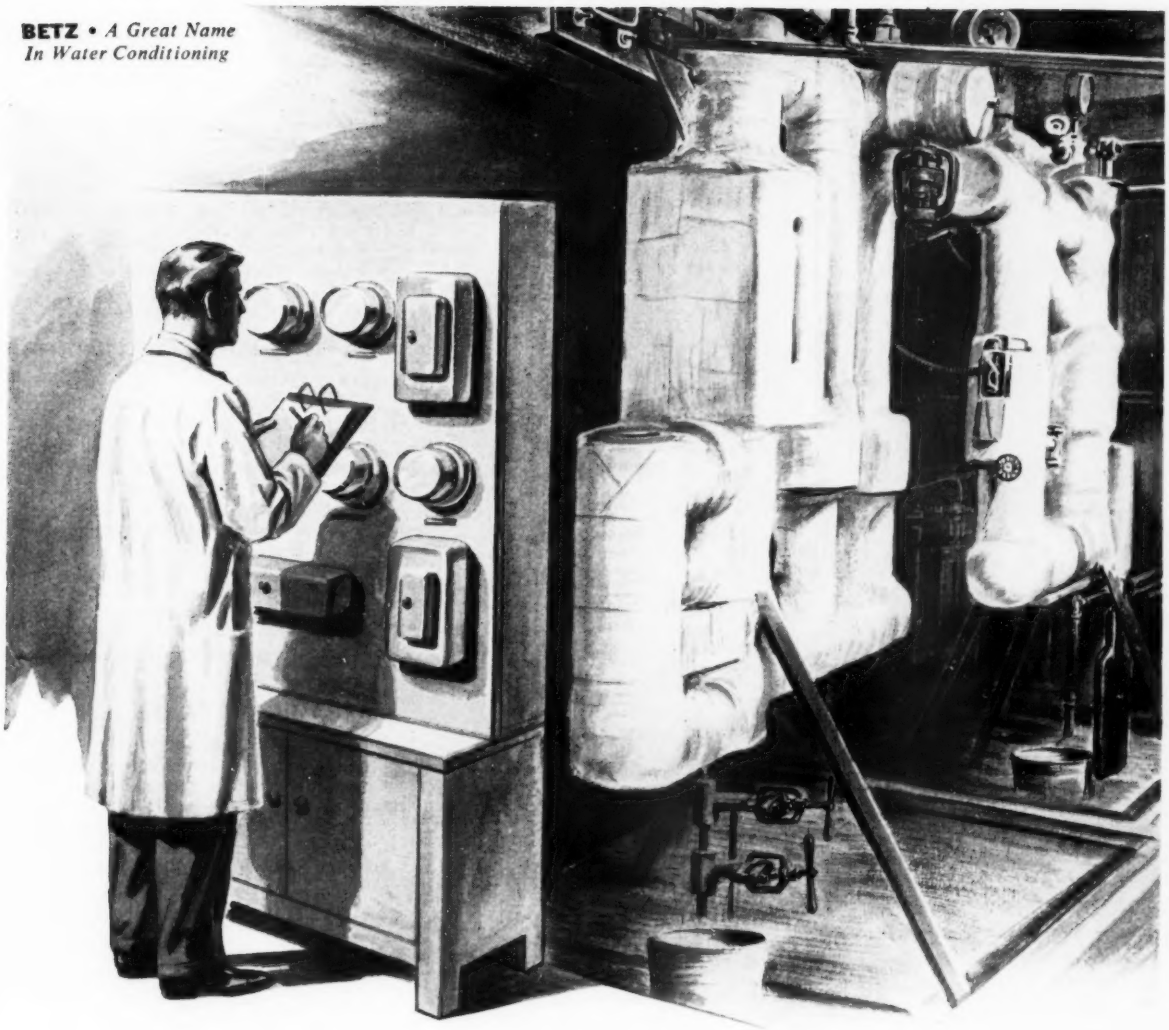
"Thank you very much for the Roster of Plant Engineers' Organizations. This looks like a very useful publication, especially when we may want to contact some of the associations outside of New York.

"In going over this roster, I can't help but think of the tremendous influence Dick Morris exerted in the development of these various plant engineering organizations throughout the country. The write-up covering the first forty years was particularly interesting.

"I was very happy to see the recognition given to Fred Gibson for his work in organizing the Boston and New York groups. In your write-up, you quote from a letter by Fred Gibson in which he mentioned the name of W. H. Larkin. He is the father of Bill Larkin of The Air Preheater Corp. Young Bill has followed in his father's footsteps both in ASME activities and in taking a very prominent part in the activities of the New York Society of Professional Engineers, where he is currently serving on the Board of Examiners.

"You will be interested to know that a group of six plant engineers from the Netherlands Team visited our plant. We

BETZ • *A Great Name*
In Water Conditioning



Proving ground for an idea

Many of today's industry-accepted water conditioning techniques were unknown just a few short years ago. Yet they were made possible by the extensive research which is carried on daily at our headquarter laboratories in Philadelphia.

Little wonder then, that we consider our *continuing* program of research and development so important.

The testing and retesting of new chemical compounds and formulations—*under actual plant conditions* in complex "Tom Thumb" equipment like this—is only a small part of our research program conducted to assure better water conditioning for industry.

As a result, advanced Betz discoveries, tested in the laboratory and *job-proved* in the field, have vastly increased operating efficiency and economy in industrial plants, petroleum installations, and institutions—everywhere.

W. H. & L. D. BETZ, Gillingham & Worth Streets, Philadelphia 24, Pa. In Canada: BETZ Laboratories Limited, Montreal 1.

BETZ

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

For more facts circle 524 on Reply Card

SAVES AS IT LIFTS

It's the 'Budgit' Aluminum Chain Block, the one-man hoist that's light, easy to carry, hang up and use anywhere for spot-lifting. The ¼-ton size weighs only 29 lbs., yet the full load can be lifted smoothly with a pull of only 25 lbs. on the hand chain.

The 'Budgit' Aluminum Chain Block is tough — gives economical, long-life performance in everyday service. Spur-geared efficiency speeds lifting, and the big automatic load brake and over-capacity hooks and heat-treated load chain safeguard man, load and hoist. Capacities: ¼, ½, 1 and 2 tons. Ask your "Shaw-Box" Distributor for detailed information or write for Bulletin 398.

'BUDGIT' I-BEAM TROLLEYS make every hoist more useful. Easily adjusted to fit various I-Beam sizes. Tough steel construction. Wheels equipped with ball bearings. Capacities: 500 to 4,000 lbs. Prices start at $15.50. Write for Bulletin 390.

'Budgit' ®
CHAIN BLOCKS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial Instruments, and Aircraft Products.

For more facts circle 525 on Reply Card

BACKTALK

spent the day inspecting maintenance facilities and discussing procedures. They were a very interesting group, and full of enthusiasm for the visit to the Plant Maintenance and Engineering Conference in Chicago. I hope they enjoyed their visit as much as we enjoyed having them." *F. L. Bradley, Forstmann Woolen Co., Passaic, New Jersey.*

PLANT ENGINEERING:

"I have received your book containing the information with regards to members of the various Plant Engineering Clubs.

"I might say that this book was a pleasant surprise to me, as I have often thought it would be nice to know men in the different cities, in which we have interests, who are working as plant engineers. *D. R. Long, Crown Cork & Seal Co., Inc., Crown Can Division, Philadelphia, Pennsylvania.*

PLANT ENGINEERING:

"Thank you for the Roster of Plant Engineers' Organization in the United States. There was a long lapse between the formation of the Boston Club in 1915 and the formation of the New York group in 1945. However, the idea appears to be snowballing and undoubtedly will some day attain the proportions it deserves.

"Incidentally, my status in the Boston Club has been changed from a regular member to an honorary member. This change was necessary because of my change in position." *L. E. Clover, Manager, Plant Engineering & Maintenance Services, General Electric Realty Corp., Schenectady 5, New York.*

► PLANT ENGINEERING is most pleased with the way plant engineers have responded to the first attempt at compiling a listing of members of all the Plant Engineers' Organizations in the United States. Because of the many requests for additional copies, we have completely exhausted our supply. We will certainly have to take this into consideration when we prepare the next Directory the latter part of this year.—*Editors.*

Articles to Help Training Program

PLANT ENGINEERING:

"We are developing a Mechanics Training Program here at the Pulp Division of Weyerhaeuser Timber Co. for our 356 maintenance mechanics. We operate three chemical pulp mills manufacturing kraft and sulphite bleached pulp and kraft paperboard. Our mechanics are millwrights, pipefitters, welders, painters, electricians, instrument mechanics and masons.

"We are trying to build up a library of training books, handbooks, and pamphlets so that our mechanics can have the best study material available to help them learn their trade.

"I will give two examples of articles that have appeared in PLANT ENGINEERING that would be suitable for training our maintenance mechanics: 'Bearing Maintenance for Industrial Electric Motors,' January, 1954, and 'Which Bearing for Which Service,' February, 1954.

"I would appreciate it if you would send me a list of any of your available reprints of articles on valves and piping, instrumentation, power transmission equipment, painting, welding, bearings, gear reducers, electrical motors and equipment and masonry." *Roger N. Wiewel, Pulp Division, Weyerhaeuser Timber Co., Longview, Washington.*

Article to Serve as Blueprint

PLANT ENGINEERING:

"In the February, 1954, issue, there is a very interesting article entitled 'Compressed Air Survey Knocks Wind Out of Losses.' I wonder if about a half dozen copies of this article could be sent me for distribution to help back up suggestions for a somewhat like procedure.

"We have over a period of time made numerous changes in our operating procedure that have been covered in this article. Others mentioned in the article we would like to make." *S. H. Widdicombe, Welding Engineers, Inc., Norristown, Pa.*

Words We Like to Hear

PLANT ENGINEERING:

"I want to acknowledge your letter enclosing copies and tear sheets of the February, 1954, issue of PLANT ENGINEERING, containing the article 'International Harvester Checks Machine Repairs Daily.'

"Would appreciate very much your extending my thanks to those responsible for the compilation of the article—they certainly did a fine job covering the many details involved." *P. C. Booty, Works Manager, International Harvester Co., West Pullman Works, Chicago, Illinois.*

What's Best Line-Up of Lathes?

PLANT ENGINEERING:

"We are regular readers of your magazine, and find it both helpful and interesting. We are wondering if you can help us with a problem, which we haven't seen very much in writing for some time.

"We are rearranging our general machine shop and would like to know if there are any recommendations for the line-up of turret lathes, as to the most economical angle and floor spacing of the machines.

"If you have anything, which you feel would be of interest to us, we would be very glad to hear from you. *Robert Barr, General Superintendent, Electric Specialty Co., Stamford, Connecticut.*

► Unfortunately, we do not have any material on hand so we are taking the liberty of asking Mr. Jordan D. Wood, Public Relations Manager, Jones & Lamson Machine Co., Springfield, Vermont, to find out if any data is available in his company. If any readers have any suggestions, Mr. Barr will be pleased to hear from you.—*Editors.*

"Who said people don't like Black?"

Pitt Chem coatings withstand years of exposure to a wide variety of atmospheric and chemical conditions.

DON'T get us wrong—we're all for pretty colors. Sky blue pink may be a smash hit on the walls of a bathroom or on a slick convertible sports car. But, if you're trying to save your plant and equipment from industrial corrosion, you'd better pick a protective coating with a work-horse color. A recent survey shows that plant maintenance people go along with us on that. They pick black as one of the two most popular industrial coating colors. Why?

It doesn't fade
It doesn't need cleaning
It "goes" with other colors
It creates no glare

And remember this: The black color of Pitt Chem Tar Base Coatings tells you they're made of one of the most impervious and durable of all protective materials—coal tar pitch. For long-lasting, economical protection against most mineral acids, alkalis, corrosive vapors and moisture, there's no finer protective material on the market today. ● If you have a corrosion problem, write or call a Pitt Chem Coating Specialist today. He'll gladly make recommendations . . . without cost or obligation.

PITT CHEM 101—For Severest Conditions
PITT CHEM 102—Maintenance Coating
PITT CHEM 103—General Purpose Coating
PITT CHEM 104—Potable Water Service
PITT CHEM 105 AQUATAR—A Water Dispersion
PITT CHEM 106 TARMASTIC—Sealing Mastic
PITT CHEM 107 PACHKOTE—Specialty Coating
PITT CHEM 110—Coating Sealer

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COKE & CHEMICAL CO.
Grant Building — Pittsburgh 19, Pa.

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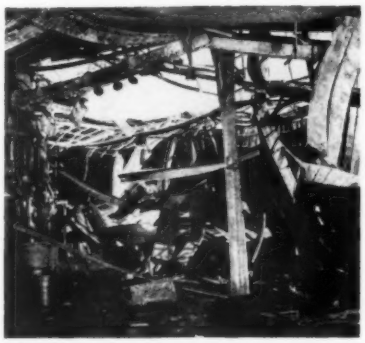
PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by E. B. Skubik

Hydraulic Fluids Formulated For Reduced Fire Hazard

MOST OF THE HYDRAULIC fluids used by industry today are of types which have relatively high flashpoints when compared with liquids we normally think of as being flammable. How then does it happen that fires of great intensity can result from the accidental ignition of hydraulic fluids?

There is a lesser known characteristic for determining the fire hazard of liquids known as the "spray flammability" characteristic. Essentially this characteristic is determined by the ability of a fluid to burn under conditions simulating a leak or rupture under high pressure. Many types of hydraulic fluids which have flashpoints in excess of 250 F, when subjected to tests to determine its spray flammability characteristics, are found to possess hazards comparable to many low flashpoint flammable liquids, such as benzene.



These are some of the results from a half million dollar fire set off by the rupture of a line on a hydraulic press

Sparked by the pressing need for a safer hydraulic fluid for use in aircraft and in certain manufacturing operations, several manufacturers have produced hydraulic fluids which materially reduce, and in some cases entirely eliminate, fire hazards connected with the use of these liquids. These safer fluids are formulated using such materials as chlorinated diphenyl, emulsified oils, glycol solutions and certain phosphate materials.

The safety of one of these newer fluids is demonstrated by the fact that no ignition occurred when a fluid was sprayed through a small orifice under 1,000 lb pressure onto the hottest portion of an oxy-acetylene flame (approximately 6,000 F). *From FIA Sentinel, published by Factory Insurance Association, Hartford, Conn.*

Insulation Choice

INSULATION for hot piping and equipment has one major purpose: to conserve heat. It would seem, therefore, that the obvious basis for selecting an insulating material would be to pick that one which saved the most heat, the insulation with the lowest heat transmission. Engineers experienced in insulating problems know it is not that simple, of course.

A certain metal alloy, for example, may be highly desirable for its light weight but it may be too rigid or too

(Continued on page 34)

Battery Charging System Utilizing Overhead Power Duct and Cable Reels Pays Dividends

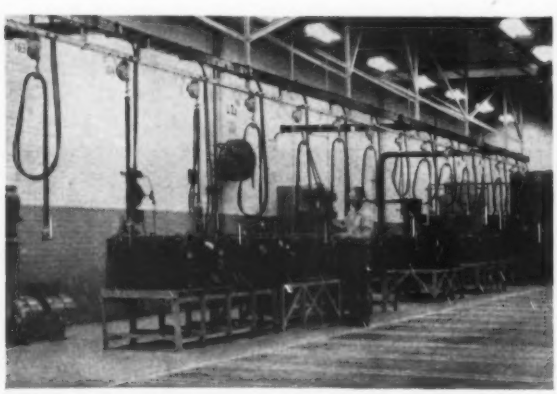
REMARKABLE SAVING in time, manpower and money was effected by the installation of a multiple overhead lead battery-charging system in the Allison Div. plant of General Motors Corp. in Indianapolis, Indiana. Formerly two men were required on every battery change; now it is possible for one man to handle 19 charges.

At the end of each shift trucks are parked in an orderly fashion guided by lines painted on the floor setting off sufficient space for each unit. The numbered painted stalls and correspondingly marked trucks prevent confusion in parking.

Instead of the haphazard maze of cables sprawling over the floor, short cables, fed from an overhead bus duct are available at each numbered space. The trucks are prevented from overrunning the wire cables because the slack is taken up by spring reels.

Although the batteries weigh more than half a ton each, no hoists are used. A handling unit equipped with conveyor rolls and a hydraulic lifting device enables the operator to transfer the batteries to a conveyor when an exchange is to be made. No chain or wire rope slings which could short across the cells are in use.

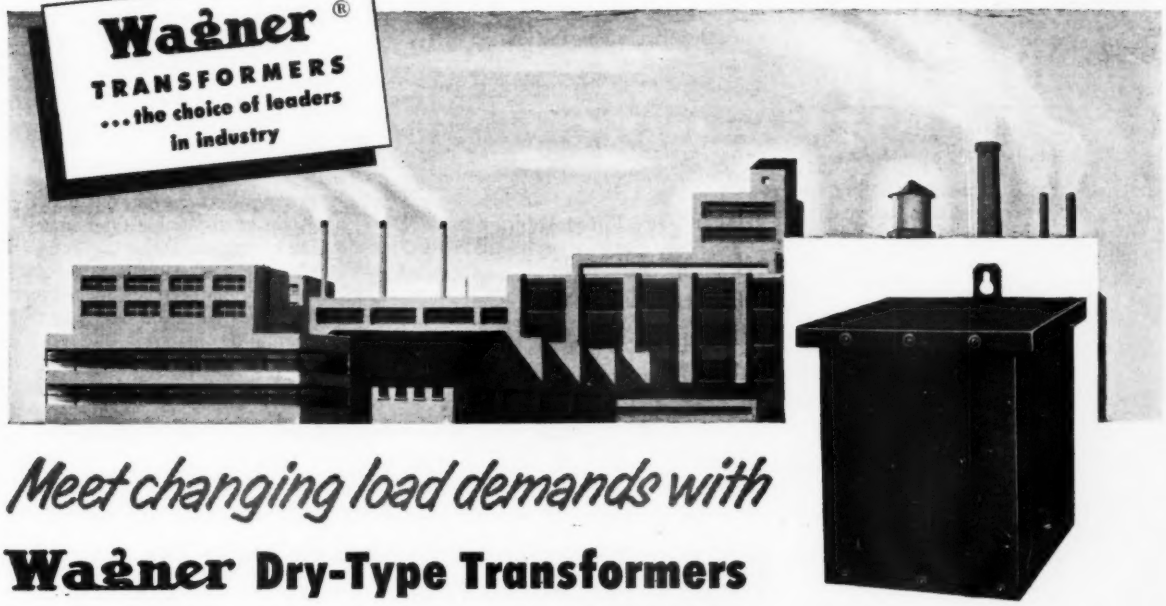
Usually, recharging is done at the end of shifts without removing the battery from the trucks. An unusually heavy day of work sometimes necessitates a change of battery, but in that case a fully charged spare is ready and the change can be accomplished in minutes. *From AllisoNews, published by the Allison Div. of General Motors Corp., Indianapolis, Indiana.*



Overhead duct carries power to the numbered charging stations. Reels keep the cables off floor adding to area neatness

The station number painted on each truck besides the one designating the department makes equipment spotting easy

Wagner®
TRANSFORMERS
...the choice of leaders in industry



Meet changing load demands with

Wagner Dry-Type Transformers

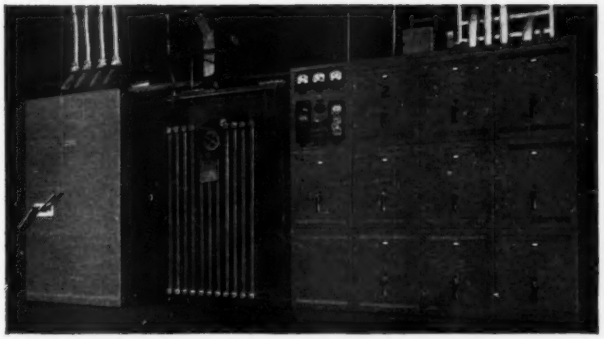
Wagner dry-type transformers can solve your problems by putting the right voltage close to the load wherever machines, portable tools or lights require voltage changes.

SAFE- Wagner dry-type transformers meet all requirements for indoor installation. They will save you money on insurance premiums. Fireproof vaults or other special protection are unnecessary—even where fire hazards are present.

ECONOMICAL- when you use Wagner dry-type transformers, you reduce installation costs—you reduce line losses—you eliminate long runs of secondary copper—and you can forget about maintenance.

COMPACT- Wagner dry-type transformers are small in size—light in weight—easy to install and easy to move whenever changes in plant facilities make it necessary.

Wagner general-purpose dry-type transformers are available in single-phase units, 600 volts and below, in sizes 1, 1½ and 2 kva—55° C Rise; and in sizes 3 to 100 kva—80° C Rise. Write for Bulletin TU-57.



Unit Substation Transformers

for load-center power distribution

Wagner three-phase dry-type load-center transformers are built in ratings through 2000 kva in the 15-kv class and below. Transformer and incoming line section are housed in compact factory-matched enclosures, designed for direct connection to matching secondary switchgear to form a closely coupled unit substation that is streamlined in appearance and readily accessible. Complete enclosure of all equipment assures safety against contact with live parts.

Bulletins TU-56 and TU-13 give full information on Wagner Dry-Type and Liquid-Filled Substation Transformers. Write for your copies.

Wagner Electric Corporation EST. 1891

WAGNER ELECTRIC CORPORATION
6492 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

T54-1A

For more facts circle 527 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 32)

pliable for the job at hand. It may not have the load bearing ability desired, or it may corrode too readily. The answer is usually a compromise calling for a combination of factors which will give the best performance over the longest period of time.

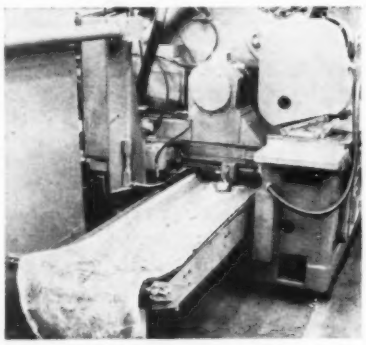
This is equally true of insulation. The material selected must not only be suitable for the particular service conditions, but the method of application and outer finish of the insulation surface must be varied to suit the particular condition to isure the greatest heat saving over the longest period. The services of an insulation engineer from a contracting or manufacturing organization will help solve these problems.

An insulation should have the lowest conductivity rating or k-factor consistent with long life; it must be resistant to normal mechanical damage, it must resist compression in order to maintain its thickness, it must have good handleability and ease of application to insure being properly applied. It must not suffer detrimental physical changes from exposure to the temperatures involved, and it must be free from organic substances which can carbonize, rot, disintegrate or otherwise impair the composite material. It is often important that it be fire-resistant.

If an insulation has these qualities, its economic value can be computed readily. It is necessary only to compare first costs with the potential heat savings over the amortized life of the materials in question. Assuming the usual differentials in the market prices of existing insulations, it will invariably develop that the quality insulation is the best buy. *From an article in M.I.M.A. News, published by the Magnesia Insulation Manufacturers Association, Washington, D. C.*

Grinder Uses Filter Medium For Swarf Collection

ONE OF THE PROBLEMS confronting engineers of Norton Company's Grinding Machine Division in developing a multi-wheel grinder was the elimination of the grinding swarf produced by several grinding wheels cutting simultaneously.



Chain belt handles the filtering material which separates swarf and coolant

In this machine, a number of grinding wheels are mounted on a heavy duty spindle between cartridge type bearings. In a single plunge grind, these wheels grind multiple diameters which may be of different dimensions. This one machine may easily do the work of several machines in a plant set up for high production grinding.

Normally the downtime required to remove the grinding sludge from these wheels would be considerable. To provide automatic and continued sludge removal, Norton engineers adapted certain components of the Delpark filter.

This unit consists of an endless chain belt type conveyor on which rides a strip of disposable filter material. The conveyor forms a trough into which the used coolant falls. As the filter medium becomes loaded, a float control advances the conveyor to bring clean filter material into position. The swarf which has been filtered is collected on the filter medium in a metal receptacle for easy disposal.

With such a filter arrangement, the coolant sump on the machine will rarely require attention. *From a Norton Co. release, Worcester, Mass.*

Babbitted Bearing Tips

LARGE PROPORTION of machinery relies on babbitted bearings for efficient operation. Bearing failures can cause machinery damage and can lead to even greater losses in downtime.

Good babbitting practice and attention to other bearing details reduce costs due to failures and promote smoothness in operation. Here are some suggestions:

Select the proper bearing metal. The recommendation of the equipment supplier or a reputable manufacturer of bearing alloys should be sought and followed. Generally speaking, tin base babbitts are best for high speeds and heavy-duty service . . . lead-base babbitts for medium or low speeds and loads.

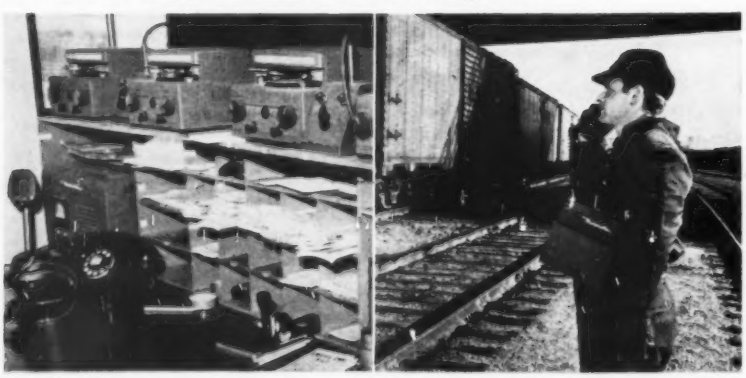
In making bearings, (melting), make sure that the melting pot is clean, heat the kettle uniformly to prevent segregation, stir the molten metal thoroughly by using a long-handled steel rod with a perforated steel plate attached, control metal temperature with a pyrometer, do not allow the metal to cool while in the pot, or to stand overnight. Segregation will usually occur.

Do not add drosses, sweepings, or skimmings. They usually contain detrimental impurities. The safest, and the least expensive procedure is to return all these materials to a reputable smelter for refining.

In bonding, machine the shell surface to a "phonograph" finish, avoid use of lubricant when taking the final cut, degrease in a commercial alkaline cleaner held just below its boiling-point, etch for three to five minutes in an aqueous solution of 50 per cent

(Continued on page 40)

Car Checker Beams Information to Recording Unit



Car checker calls out numbers of passing cars. These are transmitted by means of radiophone to the yard office where they are picked up by a recorder such as those at the left. Recorder is switched on automatically when message is being sent. When plastic disc is filled the unit stops and another recorder continues the job. (From Motorola Newsgram, published by Motorola, Inc., Chicago, Ill.)

HOW NEW SOLNUS OILS HELP MAKE AIR COMPRESSORS FIRE SAFE

Actual photographs show amounts of carbon residue left after dropping equal quantities of Solnus and two other oils on steel plates and baking in a closed oven at 500°F for 24 hours. The three oils all had viscosities of 300 SUS at 100°F.

SEE HOW CLEAN SOLNUS LEAVES HOT METAL

New SOLNUS Oil 0.9%

Typical Naphthenic Oil 5.5%

Typical Paraffinic Oil 9.0%

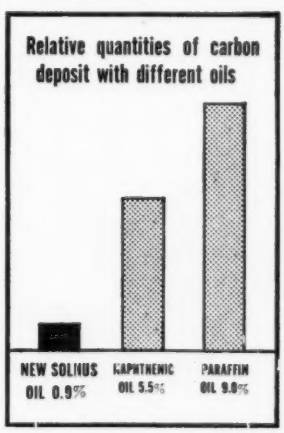
The biggest cause of air compressor fires or explosions is carbon formation on valves and in discharge lines. The best way to avoid these risks is to use the lubricating oil having the lowest tendency to form carbon.

New Solnus Oils have been proved ideal for air compressor use. The minute amounts of carbon that will form are of a fluffy nature; so they blow off quickly and do not build up. Thus the danger of fire or explosion is largely removed.

Solnus Oils have other important advantages, too. Your compressors need cleaning less frequently. This reduces maintenance costs. Shutdowns are less likely. Plant efficiency is increased.

Solnus Oils are also ideal for circulating systems, hydraulic systems, gear boxes, and general lubrication of your industrial equipment. They simplify your storage problems by doing with *one oil* many jobs that would otherwise require *several*. Combine their ability to protect metal parts against corrosion, their resistance to oxidation, and their moderate price and you see how Solnus Oils give you "more lubrication per dollar."

Let us send you our complete technical bulletin on Solnus Oils. Just write Dept. PY-4.



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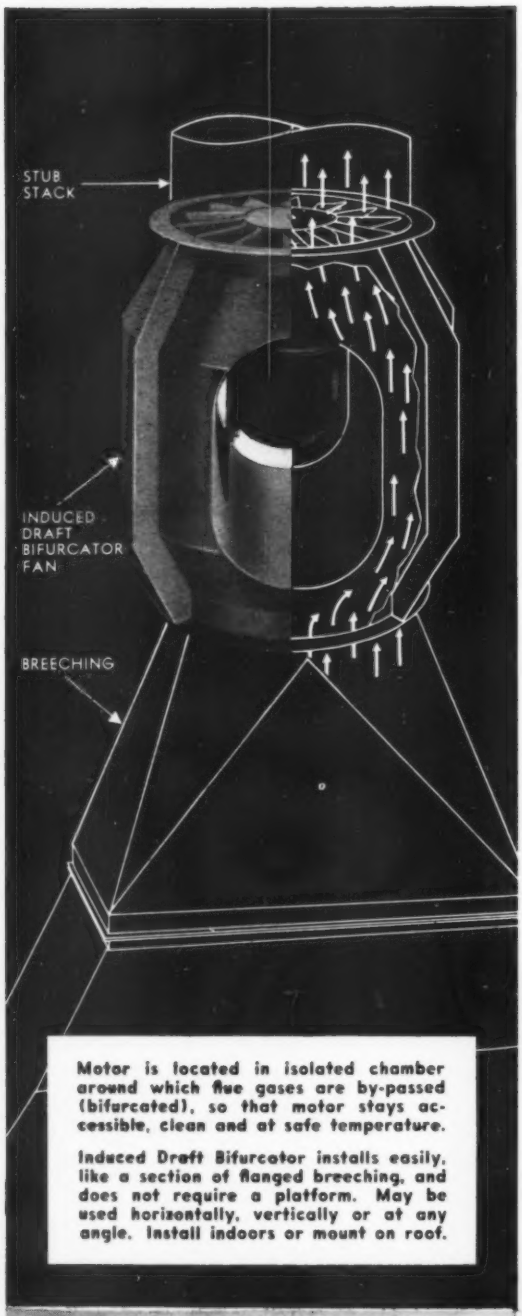


ELIMINATE TALL STACK...SAVE on COST and MAINTENANCE

BIFURCATOR FAN

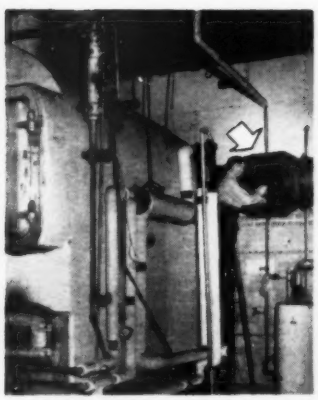
provides controlled boiler draft

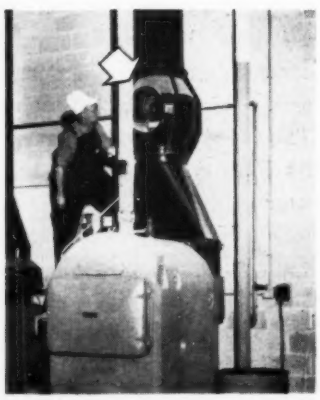
The Induced Draft Bifurcator Fan provides controlled draft for boilers and furnaces under all weather conditions, and yet costs only a fraction as much as a tall stack. An Induced Draft Bifurcator Fan also solves the draft problem when you have no room for a tall stack or object to its unsightly appearance.

Bifurcators provide adequate draft for high-pressure boilers delivering up to 60,000 pounds of steam per hour and for low-pressure boilers rated up to 190,000 EDR. For specifications and construction details, use the handy coupon to request free Bulletin DB-32-53.

Motor is located in isolated chamber around which flue gases are by-passed (bifurcated), so that motor stays accessible, clean and at safe temperature.

Induced Draft Bifurcator installs easily, like a section of flanged breeching, and does not require a platform. May be used horizontally, vertically or at any angle. Install indoors or mount on roof.





DeBothezat Fans

Division of American Machine and Metals, Inc.

EAST MOLINE, ILLINOIS

DeBOTHEZAT FANS, DEPT. PE-454
Division of American Machine and Metals, Inc.
East Moline, Illinois

Please send me free Bulletin DB-32-53 containing data on Induced Draft Bifurcators.

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For more facts circle 529 on Reply Card

BULLETINS just released and of immediate plant interest

INSTRUMENTS, CONTROLS

101 **Control Centers**—Advantages of control centers and their versatility are discussed in this 28-pp booklet. Illustrated with photos and full-colored drawing, booklet shows 10 typical installations of control centers and explains how this equipment can lower costs. Design and construction features are explained, and three basic NEMA types of construction described. Electrical and mechanical construction details are shown, typical specifications provided and handy space requirement tables included. The Clark Controller Co.

102 **Data on Circuitry**—Bulletin 112, 8 pp, explains functioning of 11 control and alarm circuits utilizing meter-relays. Describes circuits for battery charging control, null-balance pulsing, over-or under—voltage or current alarm, temperature control. Discusses principles of operation of meter-relays and some limitations on their use. With each control diagram, lists components for use in circuit; also lists plug-in assemblies from which controls can be made. Assembly Products, Inc.

103 **Instrumentation in Action**—Included in the 48-pp fourth quarter issue of Instrumentation are articles on heat treating of aluminum, controlling fuel to open hearths, control of recirculated cooling water quality, and the production and finishing of beryllium copper. Also describes the central monitoring of 119 tempeartures in an air-conditioned building. Industrial Div., Minneapolis-Honeywell Regulator Co.

104 **Portable Scales**—Form 2004 describes company's new 200 series of scales, presenting both bench and full-height models. Stresses larger platform, new locking mechanism, other advantages of these scales for use on receiving dock, in manufacturing processes, shipping rooms. Toledo Scale Co.

105 **Bin Level Indicator**—A handy reference manual for installation and maintenance use, Form BD-5A, 20 pp, describes and illustrates company's pressure-actuated bin level indicators which show level of granular, pulverized and semi-liquid materials in tanks and silos. Lists advantages of low cost, easy installation, few maintenance requirements. Includes wiring diagrams, installation data for various types of units. Describes aerator unit for introducing low-pressure air into dry materials to restore fluidity. Bin-Dicator Co.

106 **Level Control**—Bulletin A, 6 pp, introduces a floatless electronic type level control with performance said to be unaffected by pressure temperature, acids or salts. Contact with the liquid is made by a stainless steel probe. Bulletin gives specifications for probes and fittings, application suggestions. Also gives data on a magnetic liquid level control. Ferrara Inc.

107 **Gage Glasses**—Pyrex and Corning gage glasses, their dimensions and tolerances, recommended maximum working pressures, are discussed in Bulletin EG-1. Explains how to cut odd lengths of tubular gage glasses and how to install them. Technical Products Div., Corning Glass Works.

BOILERS AND GENERATORS

108 **Water Tube-Steam Generator**—Bulletin SB-51, 16 pp, discusses features of Keystone two-drum water tube steam generator for delivery of low cost steam. Cites advantages of conservative boiler rating (full five sq ft of heating surface for each developed horsepower), automatic controls, easy installation, fast steaming qualities, compact size. Gives specifications on all materials furnished, includes accessories. Erie City Iron Works.

109 **Boiler-Burning Unit**—Catalog 502, 16 pp, gives detailed description of Kewanee-Petro burner unit for gas, oil, or combination firing, for high or low pressure operation. Illustrated in full color, includes ratings, dimensions, data, supplemental equipment, discusses thermal viscosity principle. Kewanee-Ross Corp.

110 **Packaged Steam Generator**—Bulletin BE3, describing oil or gas fired automatic boiler in sizes from 20 to 50 hp, stresses advantages of the unit's two-pass system with forced draft. A large cutaway illustration shows design details and component parts are discussed in detail. Continental Boiler Div., Boiler Engineering & Supply Co., Inc.

VALVES AND PIPING

111 **Valve Servicing**—A 30-minute operation for welded-bonnet integral-seat valves that does not require their removal from the line is described in Bulletin 531. Besides giving service procedure, includes a blueprint for making the simple tools required. Illustrations include step-by-step photos. Edward Valves, Inc.

The Reader Service Card below needs no postage. Just circle item numbers of all bulletins wanted. Be sure to include your name, your job title and company name.

112 **Blow-Off Valves**—Bulletin B-426, 20 pp, on blow-off valves for boiler pressures up to 400 lb WSP contains installation recommendations, construction information on Yarway seatless and double-tightening blow-off valves. Includes dimensional data, ordering instructions, prices. Yarnall-Waring Co.

113 **Diaphragm Motor Valves**—Catalog 800, 36 pp, describes, illustrates manufacturer's Series 800 diaphragm motor valves, with double and single seated, low flow, Venturi and three-way bodies. Tables give specifications, dimensions, ordering information. Industrial Div., Minneapolis-Honeywell Regulator Co.

114 **Light-weight Pipes**—As a practical help to pipe users, Bulletin 507 shows typical applications of company's light-weight lockseam-spiralweld pipe and fittings. Includes standard specifications on pipe from 4 to 30 in. dia., also data on fabricated fittings, flanges, connections. Naylor Pipe Co.

COMMUNICATION

115 **For Selective Calling**—Detailed information on selective calling equipment for individually controlling radio-equipped vehicles is given in this illustrated bulletin. Describes both the pushbutton type and dial-operated control units, includes specifications. The Hammarlund Mfg. Co.

116 **Telephone Signaling Device**—An illustrated 6-pp brochure on the P-A-X code call service tells how plant engineers and others can be reached anywhere in the plant by means of a special signaling device, part of an internal telephone system. Automatic Electric Co.

April, 1954

Card void after 6 months.

PLANT ENGINEERING

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6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50

BULLETINS

101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116
117	118	119	120	121	122	123	124
125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148
149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164
165	166	167	168	169	170	171	172
173	174	175	176	177	178	179	180

DATA FILE

201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217
218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234
235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251
252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268
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286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302
303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319
320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336
337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353
354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387

ADVERTISED PRODUCTS, SERVICES

501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560
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Use this space to ask for tear sheets, other information wanted.

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THIS MONTH'S LITERATURE OF MERIT treats wood fabrication . . . belt repair . . . pump care . . . system plans . . . crushing

117 **How to Use Presdwood**—This 32-pp booklet is filled with design and construction data on Presdwood. Although much of the material presented deals with use of Presdwood in homes, the book offers suggestions of value in industrial construction and remodeling. Sections of this well-illustrated and practical handbook cover product data, working, application information for both interior and exterior use, and specifications. Includes instructions on proper conditioning, use of adhesives, types of bends finishing, interior joints, fastening. A feature is a table showing properties, sizes available and intended applications. Masonite Corp.

118 **Repairing Conveyor, Elevator Belting**—This 32-pp manual on how to splice and repair conveyor and elevator belting contains step-by-step photos showing good splicing procedures. Describes splicing materials, tools needed, methods for splicing cord and fabric belts. Gives instructions in on-the-job vulcanizing of splices with portable vulcanizers. Chart shows quantities of material needed for specified jobs; tables give correct splicing. B. F. Goodrich.

119 **How to Care for Vacuum Pumps**—Dozens of practical tips on installing, operating and maintaining vacuum pumps and systems are provided in 16-pp Bulletin 755, a pocket-size handbook. Contains hints on the proper way to make leakproof connections in vacuum piping layouts; recommended types of gages, valves, fittings and gaskets; trouble-shooting procedures to follow, when pump is knocking, won't start or won't produce a satisfactory vacuum; and "do's and don'ts" for trouble-free service. F. J. Stokes Machine Co.

120 **To Reduce System Investment**—Bulletin GEA-5847, 24-pp, 3-col., tells how to reduce system investment by distribution system planning and substation selection. Contains an analysis of distribution investments, a list of factors involved in determining optimum substation size, and a discussion of the types of circuits supplying distribution substations. Cites seven trends in low-cost expansion. General Electric Co.

121 **Handbook on Crushing**—Not an ordering catalog, this 32-pp manual is aimed at a better understanding of mechanical crushing in order to promote better results from crushing operations. Well illustrated, booklet stresses importance of suiting the crusher to the job. Four means of mechanical reduction—impact, attrition, shear and pressure—are discussed. Also included is information on power requirements of crushing, and selection factors, also a materials index table. Hammermills, impactors, single rolls, jaw crushers, and other crushers are covered in detail. Pennsylvania Crusher Co.

MECHANICAL POWER TRANSMISSION

122 **Scale Drawings for Power Drives**—Now available to plant engineers is a folder containing a set of scale drawings for company's geared Slo-Speed electric power drives. The templets are convenient in layouts and provide accurate clearance information quickly. In all, 22 sheets are included, and three views of each drive are detailed and type drawn to three separate scales. Sterling Electric Motors, Inc.

123 **Electric Brakes, Clutches**—Bulletin 6158 describes manufacturer's line of Stationary Field Electric Clutch-Couplings and Replaceable Face Electric Brakes, designed for precise, automatic control of light machine instrument and servo drives. Lists specifications; advantages include high torque easily controlled, easy remote or automatic control, simple design. Warner Electric Brake & Clutch Co.

124 **Chain Drives**—Catalog 154, 20 pp, contains data on operating characteristics and service factors, of company's pre-selected chain drives. Discusses how to select and order the proper drive, heavy duty drives, lubrication, and maintenance. The Ramsey Chain Co.

125 **How to Figure Hp of V-Belt Drive**—Interim Bulletin 20B6956B, 6 pp, presents condensation of new method of calculating hp capacity "Texrope" V-belt drives. Takes into consideration effect of belt length, ration of diameters of driving and driven sheaves on hp rating of the belt. Allis-Chalmers Mfg. Co.

ELECTRICAL EQUIPMENT

126 **Distribution Transformers**—Type SL, a large distribution transformer (250-500 kva) for increased load densities on distribution systems, is described in 8-pp Bulletin B-6134. Shows how construction and standardization allow economic handling and operation. Discusses choice of windings, accessories. Westinghouse Electric Corp.

127 **Feeder Voltage Regulator**—Company's Transformer type ⅝% step feeder voltage regulator is described in 16-pp Bulletin 01B6056D. Lists advantages of unit-type construction (a feature of regulators 750 kva and below); quick-breaking tap-changing mechanism; automatic control and voltage integrator. Allis-Chalmers Mfg. Co.

128 **Motor Control Centers**—Bulletin 170, 12 pp, defines these centers as a number of combination motor starters, each within a separate compartment, which is part of a panel section ready for installation. Diagram shows typical control center installation. Lists control unit dimensions and ratings, ordering information and data, other motor controls. Arrow-Hart & Hegeman Electric Co.

129 **Fuse Cutouts** — Sixteen-pp Bulletin GEA1816H describes open drop-out fuse cutouts for sectionalizing main feeders, switching transformers, capacitor banks, and other loads. Shows all artings, explains how the open drop-out cutout clears fault current, and how the load-break fuseholder breaks load current. Also shown are unit-combination arrester and cutout, and separate and combination mountings. Applications are cited. General Electric Co.

130 **Mercury Switches**—Catalog 90, 12 pp, gives standard designs of company's mercury switches for a-c or d-c switching applications that provide low force and tilt motion. Includes such classifications as protected, heavy duty, general use, small and sensitive switches. Gives dimensions, electrical rating, differential angle, lead wires, types of application, section on technical data. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

131 **Limit Switch Literature**—Newly published literature is available on a heavy duty machine tool limit switch permitting 11 contact arrangements. Includes descriptive bulletins, service bulletin, price sheet and ordering information. Square D Co.

132 **Push Buttons, Lights**—Sixteen-pp Bulletin GEA-5779B presents company's line of oil-tight push buttons, indicating lights, selector switches and accessories. Shows how they work, where they can be used. Illustrations include dimension and outline diagrams, cross-sections, color photos. General Electric Co.

(Continued on page 187)

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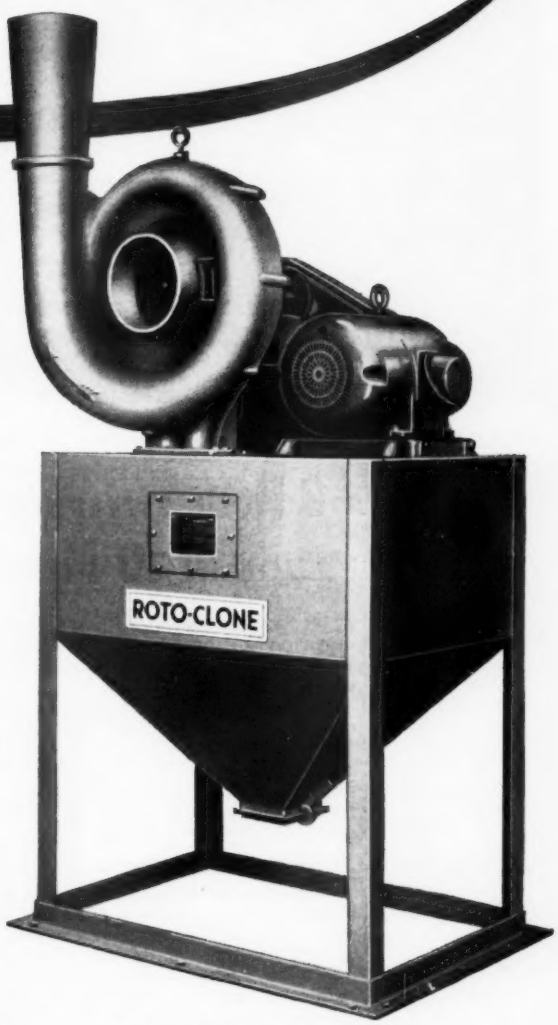

Type D ROTO-CLONE combines design and mass production economies to make it the lowest priced dust collector in its class.

Why is ROTO-CLONE priced so low? Manufacturing experience with 20,000 Type D ROTO-CLONES has introduced production economies reflected in low cost to you—the lowest cost of any collector in its class. By class we mean units of 1,500 to 15,000 cfm capacity designed for handling dry, granular dust.

Why are space requirements less? ROTO-CLONE* provides everything you need, except duct connections, in one complete, shop assembled package—high efficiency collector, exhauster, motor, drive and dust storage hopper. This compactness makes its relocation easy and economical with change in process, plant layout or production equipment.

Why is performance outstanding? ROTO-CLONE'S collection efficiency is constant regardless of exhaust volumes handled. Its cast-iron housing, cold-rolled steel blades, taper-lock hub and heavy-duty, antifriction bearings assure long, maintenance-free service.

For complete product information, call your local **AAF** representative or write direct for Bulletin 272.

*ROTO-CLONE is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydrostatic precipitator types.

AAF

American Air Filter

COMPANY, INC.

228 Central Avenue, Louisville 8, Kentucky

American Air Filter of Canada, Ltd., Montreal, P. Q.

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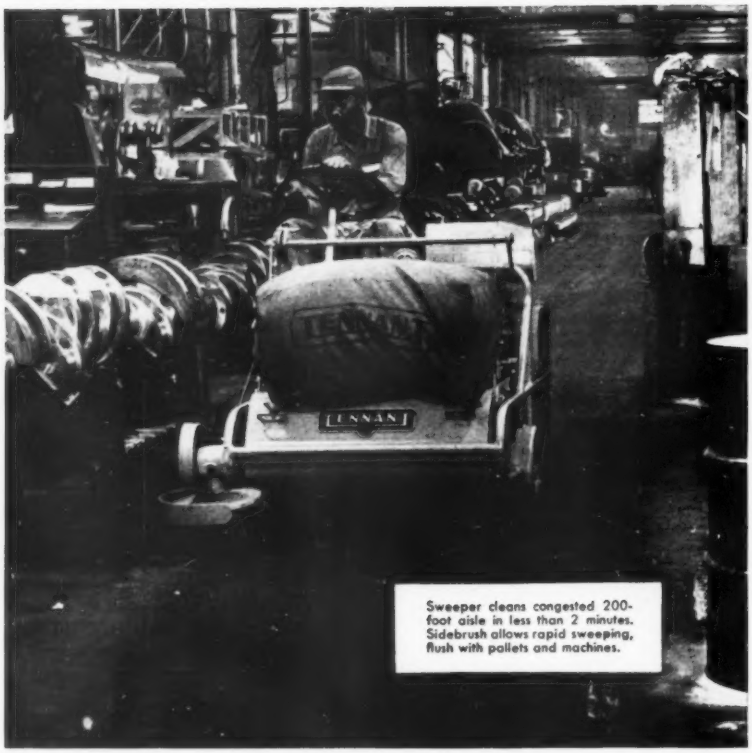

Sweeper cleans congested 200-foot aisle in less than 2 minutes. Sidebrush allows rapid sweeping, flush with pallets and machines.

This TENNANT Power Sweeper

DOES A 2 Hour SWEEPING JOB IN 10 Minutes!

By the time one man with a pushbroom sweeps halfway down one of the 200-foot aisles shown above, the TENNANT Power Sweeper has finished sweeping 6 aisles just like it.

So in just 10 minutes it can sweep an area that would often take 2 hours to do by hand.

It sweeps a 48" path far cleaner than pushbrooms—and right up to pallets and machines. Revolving brush provides 17 strokes per foot of travel, and combines with powerful vacuum system to do an extra-clean job—even draws dust from many cracks.

Often Pays for Itself in Several Weeks

In the plant shown here, one man, with the TENNANT Sweeper sweeps to the end of an aisle and back in less than 2 minutes. The machine covers a 48" path, picks up dust and litter "on the run," does a U-turn in about 3 seconds. You can reverse it instantly, turn in a 5-foot radius . . . dump its loaded dirt hopper in 30 seconds.

Performance like this—round-the clock when necessary—makes it easy for this sweeper to pay for itself in 1 to 6 months in most plants. *Write today for full information.*

TENNANT
ESTABLISHED 1870

G. H. TENNANT CO.
2572 N. 2nd Street
Minneapolis 11, Minn.

POWER SWEEPERS

INDUSTRIAL MAINTENANCE EQUIPMENT

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PLANT ENGINEERS' DIGEST

(Digest begins on page 32)

hydrochloric (muriatic) acid held at 160-180 F. If not clean, repeat degreasing and etching.

Dip into flux held at a temperature of 150 F. A saturated solution of two parts of zinc chloride and one part of ammonium chloride in water is usually satisfactory. Dip the shell into a bath of molten bonding alloy (tinner's solder) kept at about 150 F above its liquidus temperature. The shell should have a silvery appearance on removal from the bath. The shell should not be allowed to cool before casting the liner.

In casting, the mandrel and shell should be at temperatures higher than 250 F to eliminate the danger of moisture or steam. The shell should be at a temperature above the melting point of the bonding or tinning metal, the temperature of the mandrel should be approximately 100 F higher than that of the shell so that solidification can progress from the shell to the mandrel. The stream of metal should be poured against and moved around the circumference of the mandrel to prevent local overheating. Use a ladle of sufficient capacity to permit pouring the entire bearing at one time; this reduces the likelihood of cold shuts, laminations, or folds.

In the installation of bearings, make certain that all foreign particles, such as dirt, metal chips and lint, are wiped from the bearing and shaft with a lint-free material. Make certain that the clearances between the bearing and the shaft are adjusted in accordance with manufacturer's recommendations.

Set up a regular maintenance and inspection schedule for all bearings and follow it closely. Keep your lubricant free of all foreign matter by using proper filtering and cleaning devices. Run the equipment at the speed and under the load for which it was designed. *From a release of Federated Metals Div., American Smelting and Refining Co., New York, N. Y.*

Work Flew from the Machine

THAT GOOD MACHINING PRACTICE is never to be ignored was demonstrated at a Detroit plant when a steel forging was catapulted from its tool holder during cutting operations.

Instead of the Carboloy tool breaking off as it bit into a 40 lb steel forging, the forging itself flew from the machine and landed 30 ft away. The 28-in. chuck holding the work was not

Another J&L First—

SpringKore WIRE ROPE

Combines Flexibility and Crush Resistance

Always working to develop better, more economical wire ropes for industry, J&L has scored another first—SPRINGKORE.

The unique properties of a tightly coiled high quality steel spring . . . greater flexibility and resistance to crushing—are built into SPRINGKORE to provide resiliency and toughness never before possible in wire rope of equivalent strength and cost.

SPRINGKORE has *already* proved itself in the field on applications where heavy crushing action limits the service life of ordinary wire ropes. The diameter stays uniform for a longer period of time. Clearance between strands is maintained resulting in greater flexibility and increased fatigue life. The coiled spring forms a reservoir permitting excellent lubrication to reduce internal wear and corrosion.

Specify new SPRINGKORE and take advantage of these dollar-saving features:

- LONG TERM FLEXIBILITY
- RESISTANCE TO CRUSHING ACTION
- COMPLETE LUBRICATION
- MORE SUPPORTING CONTACT POINTS
- UNIFORM DIAMETER
- BETTER SPOOLING
- LESS INSIDE STRAND WEAR

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

For further information, write for J&L's new booklet, "New Wire Rope for Industrial Uses."

Jones & Laughlin Steel Corporation
3 Gateway Center, Dept. 438, Pittsburgh 30, Pa.

Please send me a copy of your booklet, "New Wire Rope for Industrial Uses."

Name_____

Company_____

Address_____

_____

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ORTON
Torque-Control
MEANS
POWER CONTROL
WEAR CONTROL
• NO JERKING, slip-clutching or racing engines!
• CUSHIONED SHOCK—only the *exact* amount of power needed to move the load!
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PLANT ENGINEERS' DIGEST

(Digest begins on page 32)

sufficiently sturdy to hold on to the 5-in billet, and the operator had not taken the proper precaution of using the tailstock.

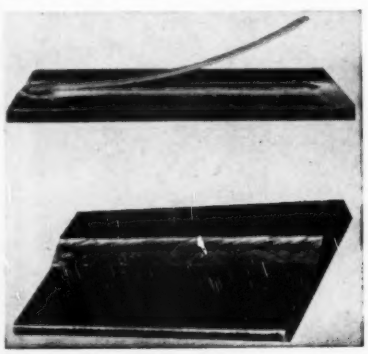
The result was a broken tool holder and a stripped and bent tool holder set screw. The tool itself was undamaged. *From a news release of Carboloy Department of General Electric Co., Detroit, Michigan.*

Powdered Metal Coatings For Welding Electrodes

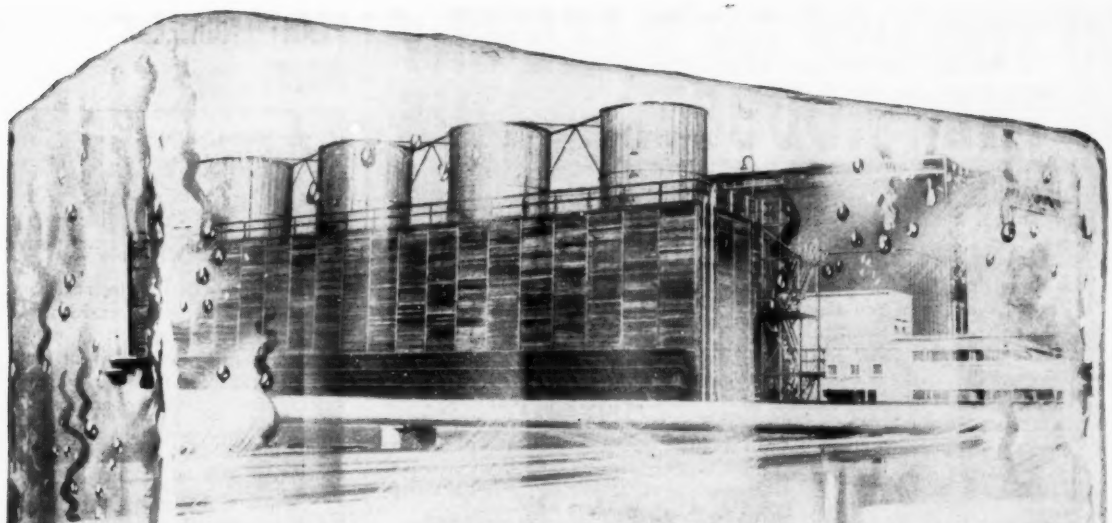
HEAVILY COATED ELECTRODES containing large quantities of powdered metal in their coatings obtain increased welding speeds on the order of 50 per cent, with appearance in smoothness and freedom from spatter almost equal to that obtained with automatic welding. Although these electrodes are still new, cost reductions already obtained in production welding indicate that welding procedures will shortly be completely revised to new standards. Powdered iron electrodes will make existing electrodes obsolete just as the jet plane has made propeller driven fighter planes obsolete.

This is not an opinion but is a calculated engineering conclusion. The basic fundamentals of the arc welding process have led inevitably to the development of powdered metal coatings and, therefore, inevitably secure their position in welding progress.

In general, as welding current increases, the speed of welding increases. The electric arc drawn from the end of a welding electrode performs the three functions of melting the core wire, melting the coating of the elec-



Upper view shows how slag peeled away by itself from bead made with metal coated electrode. Smooth and clean looking horizontal lap weld below was also produced with powdered metal coating. Arc speed was 6 in. per min faster than with conventional electrode



HOW TO KEEP GENERATORS COOL

Pritchard heavy-duty cooling towers meet the demands of industry . . . no matter what those demands are!

This 4-celled Pritchard tower, built for National Petro-Chemicals Corporation, cools condenser circulating water to keep the turbo-electric generators in their Tuscola power plant at proper operating temperatures. Note the high fan stacks, specially designed to minimize air recirculation.

The dependability of Pritchard cooling towers to meet a wide variety of specific requirements is demonstrated in hundreds of industrial and power installations throughout the country. If you want a satisfactory answer to your cooling problems — satisfaction that's *guaranteed* — contact Pritchard, a founder member of the Cooling Tower Institute.

Industry's Partner for Progress

COOLING TOWERS
SPECIALIZED HEAT EXCHANGERS
GAS & AIR TREATING EQUIPMENT

J. F. Pritchard Co.
OF CALIFORNIA
A DIVISION OF J. F. PRITCHARD & CO.
Dept. 361, 210 West 10th St., Kansas City 5, Mo.

Representatives in Principal Cities from Coast to Coast

For more facts circle 534 on Reply Card

DO YOU USE OR MAKE ANY OF THE PRODUCTS IN THIS LISTING?

List of Users

The types of industries listed are all repeat users of **Tru-Lay Push-Pull Controls.** Experimental applications are not shown.

Agricultural Equipment
Air Conditioning Equipment
Aircraft & Parts Automobiles
Bakery Equipment Boats & Ships
Bottling Machinery
Brewing & Distilling Equipment
Business Machines
Buses & Motor Trucks
Candy Making Machinery
Canning Machinery
Ceramics Machinery
Chemical Processing Machinery
Coal Mining Machinery
Coin Operated Machines
Construction Machinery
Dairy Products Machinery
Dental & Surgical Equipment
Die Casting Machinery Diesel Engines
Drinking Water Coolers
Electrical Appliances
Electrical Generating Equipment
Electrical Machinery
Electrical Transmitting Equipment
Electronic Equipment
Elevator Control Panels
Fire Protection Equipment
Food Processing Equipment
Forging Machinery
Foundry Equipment
Gas & Oil Production (Test Stands)
Glass Making Machinery
Grain Processing Equipment
Hat Machinery Heating Equipment
Hydraulic & Pneumatic Equipment
Ice Cream Making Machinery
Laundry & Dry Cleaning Equipment
Leather Working Machinery
Lumber & Saw Mill Machinery
Marine Equipment
Materials Handling Equipment
Metal Mining Machinery
Metal Working Machinery—Machine Tools
Military & Naval Equipment
Motorcycles & Bicycles
Nuclear Science Equipment
Oil Refinery Equipment Ordnance
Packaging Machinery
Paint Making Machinery
Paper Making Machinery
Photo Equipment (manufacture)
Plastics Fabricating Machinery
Plastics Producing Machinery
Power Plant Equipment
Printing & Binding Machinery
Quarrying Machinery
Radio & Television (manufacture)
Railroad Equipment
Road Building & Maintenance Equipment
Rubber Processing Equipment
Safety Locks on Fuse Panels
Sanitation Plumbing (Floor Valves)
Shoe Machinery Steel Mill Machinery
Telephone & Telegraph Machinery
Textile Machinery
Waterworks Equipment
Welding Equipment
Wire Making Machinery
Woodworking Equipment
X-Ray Machines

Whether your interest is in a single application of this versatile

PUSH-PULL CONTROL

or in its inclusion as a component of the product you manufacture, we would welcome your request for our **DATA FILE** for your further study.

Because **TRU-LAY PUSH-PULL CONTROLS** are "SOLID as a rod but *FLEXIBLE* as a wire rope" their use has simplified the design and improved the operation of literally hundreds of products as indicated in the accompanying list of repeat users.

These fine controls are designed, and painstakingly built, to have the qualities of **ACCURACY, HIGH LOAD CAPACITY, FREEDOM FROM TROUBLE, LONG LIFE, FLEXIBILITY** . . . they are frequently and successfully used in conjunction with electrical, hydraulic and air controls . . . they are thoroughly effective under almost any operating condition.

Here are some of the jobs they handle well . . . **HOT** jobs on jets and industrial furnaces . . . **COLD** jobs down to –70°F. . . . **WET** jobs in food processing and marine applications . . . **DIRTY** jobs in cement mills and coal mines . . . **CORROSIVE** jobs in chemical processing . . . **HEAVY, TOUGH** jobs on construction machinery . . . **LIGHT DUTY** jobs on business machines, drinking water coolers . . . **REMOTE** jobs 150 feet or more from control point . . . they **DAMPEN VIBRATION** to protect delicate instruments . . . and **LUBRICATION** of the inner, working member is taken care of *for life* during assembly.

• The six booklets and bulletins in this **DATA FILE** will answer further questions you may have about this versatile and dependable tool, and will also provide you with the means of defining to us the application you may be interested in.

Write for a copy without obligation

DATA FILE

ACCO

AUTOMOTIVE and AIRCRAFT DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

601 Stephenson Bldg., Detroit 2
2216 South Garfield Ave., Los Angeles 22 • Bridgeport 2, Conn.

For more facts circle 535 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 32)

trode, and melting the edges of the parts to be welded together. An increase in welding current increases the speed with which the arc can perform these functions.

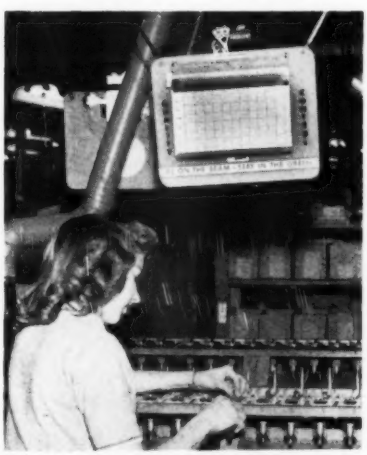
For any given size electrode, welding speeds can be increased until a maximum usable current is reached. Beyond this maximum current further increase causes difficulties which result in unsatisfactory operation. The difficulty may be an overheated electrode causing a breakdown of the coating, it may be too much penetration, gouging of the parent metal or too much spatter. In any case, the effect is to impose the top limit on welding speed.

Powdered metal electrodes effectively raise the limits on welding speeds imposed by the current carrying capacity of the core wire. More metal is available for deposition and the more efficient use of the arc heat permits increasing welding speeds without necessarily increasing currents. *From an article by L. K. Stringham, chief engineer, The Lincoln Electric Co., Cleveland, Ohio.*

Scoreboard for Quality Control

QUALITY CONTROL technique has been developed by Motorola, Inc., to single out the individual who does high quality work and give him recognition among his associates on the production line. The technique employs a personal, eye-catching scoreboard at each position on the line.

The competitive rating of employees is the focal point of the program. The



Quality control scoreboard hangs over bench where electronic tube sockets are wired in high voltage assemblies

idea is to detect errors or rejects in the radio and TV sets while they are still in the production stage by making people conscious of their jobs.

Each line operator has his own score board. It is a bright yellow plastic slate which hangs above his bench. Hooked to the front of the slate is the quality control chart. The chart is divided into the sections showing the errors made for each hour that the whole line operates. A typical production line of this firm consists of about 60 operators with a group leader for every 15, and one line supervisor. The group leader marks the quality chart each hour. He also counts the individual's errors and scores them according to his or her quality performance.

Ratings, classified as excellent, good, fair, and poor, are marked on a plastic wheel which is fastened to the back of the yellow slate. The wheel is spun to the position showing the operator's current rating. In each instance, "Professor Sharin," mythical symbol for the profit sharing fund, is the central figure in the decal marking. He holds a colored card with the rating lettered on it.

Directly under the quality index chart is the job classification. The jobs which compete for quality performance fit into four categories—trainee, operator, key operator, and group leader.

Good results were reported only a short time after the scoreboards were put to use. *From a release of Motorola Inc., Chicago, Ill.*

Two-Way Radio Unsnarls Locomotive Traffic Jams

BECAUSE OF ITS SITUATION, between a river and a main highway, some peculiar traffic problems were encountered along 36 miles of locomotive track in a Sheffield, England, steel plant.

Several attempts to relieve a bottleneck area along the track were made, but none was successful until radio control was installed.

Locomotives are now equipped with radio transmitters and receivers, with an amplifier fitted into the rear of each cab.

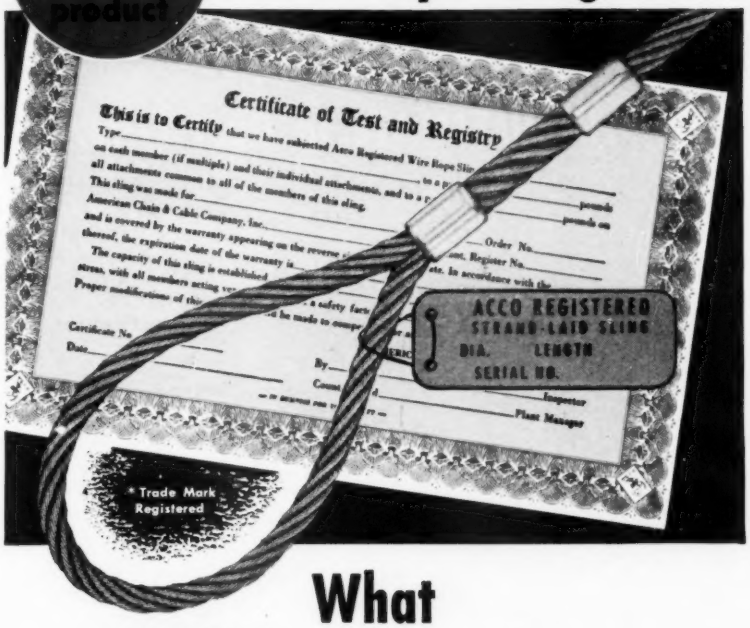
Nerve center of the system is a 20-ft control tower overlooking one of the most congested areas of the traffic network. Traffic is controlled from the tower by two foremen.

The system has overcome the difficulty of passing instructions to drivers in remote parts of the plant and has also proved its worth at night and during foggy weather.

The advantages of the system are demonstrated when hot casts of steel from a distant melting shop can be

an ACCO product

ACCO Registered* Wire Rope Slings



What ACCO Registered Means

• Primarily it means greater safety for your men and machines when loads are carried in the air in your shop. It means insurance against dropping a load which could tie up production.

But that's only part of the story. The name ACCO *Registered* on the slings you use means greater efficiency because of better design of endings and attachments. It means lower overall sling costs because every part of every ACCO *Registered* Wire Rope Sling has the same strength as the catalog breaking strength of the rope itself. ACCO even magnafluxes each hook to make doubly sure it will serve you well.

And it means that the sling has been proof-tested at the factory to twice its rated capacity. You can be sure that every ACCO *Registered* Wire Rope Sling is the safest, strongest and lowest cost lifting tool you have ever used.

Best of all, you can get them when you need them from a nearby stock. Contact your ACCO *Registered* distributor today for full information and prices. Or, write our Wilkes-Barre, Pa., office.

1 The best material
2 Unit safety factor (on bodies, rings, links, safety shackles, hooks)
3 Proof test of complete sling to twice rated capacity
4 Actual field service test of each model
5 Metal identification tag on each sling
6 Signed Registry Certificate with each sling

ACCO
TRADE MARK

Wire Rope Sling Department
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn. • In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

also Links Shackles Hooks

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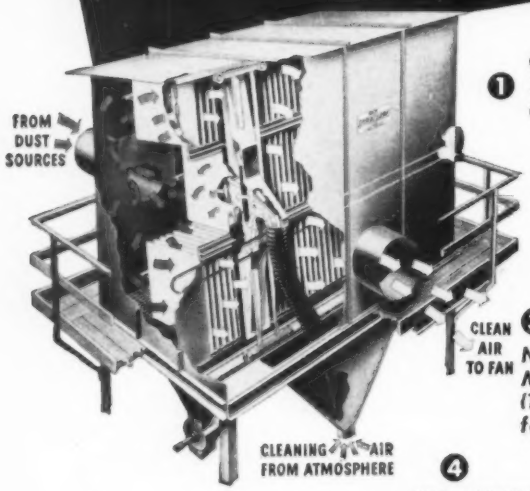
THE
DYNACLONE®
PATENTED
The ULTIMATE in Dust Filters



1 CONSTANT SUCTION at dust sources.
2 SELF CLEANING for continuous operation.
3 NO AUXILIARY MOTORS or BLOWERS (The main operating fan does the cleaning).
4 NO ABRASION of BAGS by the CLEANER.
5 LESS OVERALL HEIGHT and FLOOR SPACE.

HOW IT OPERATES

(a) Dust laden air is drawn in from the dust sources as indicated by the shaded arrows.
(b) It is diffused into the dust chamber by the baffle plate.
(c) It is then drawn through the fabric of the filter bags and is cleaned as shown by the clear arrows.
(d) Clean air passes out of the case and goes to the suction fan.
(e) Concurrently, the traveler moves back and forth across the dust wall registering successively with one bag at a time.
(f) The suction which exists in the dust chamber draws a blast of atmosphereic air through the bag in reverse directions and cleans that bag. (No shaking.)

Control your industrial dust better, for less — with the Sly Dynaclone. May we explain how?

SEND FOR BULLETIN NO. 101

THE W. W. SLY MANUFACTURING CO.
4600 TRAIN AVENUE • CLEVELAND 2, OHIO
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SLY PIONEERS & LEADERS in INDUSTRIAL DUST CONTROL

For more facts circle 537 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 32)

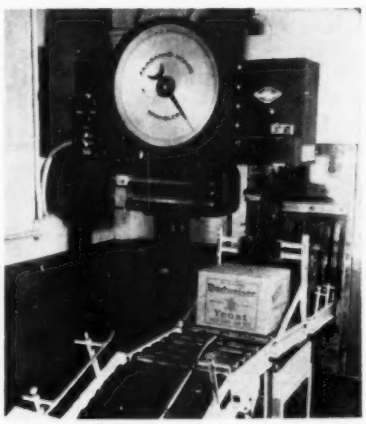
passed through the yards without any delay, so that they arrive at the soaking pits with minimum loss of residual heat. *From Target, published by the British Information Services, New York, N. Y.*

Automatic Scale Watches Yeast Weight Variation

BECAUSE BAKERS' YEAST contains a high moisture percentage, it is subject to considerable loss of weight during shipment due to evaporation. Now, with the installation of a new system of high-speed precision weight control in its plants, Anheuser-Busch, Inc., is able to guarantee full measure of yeast to its customers.

This system, which includes a printing conveyor scale, is fully automatic and requires no weigh master.

As each 50-lb carton of yeast approaches the scale it is picked up by



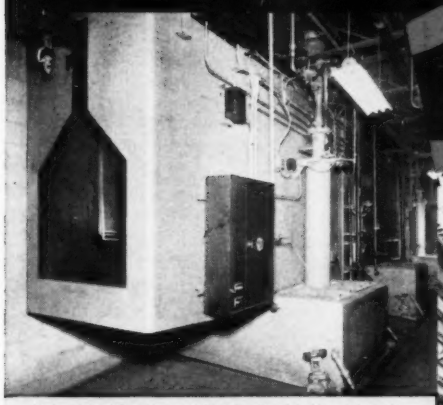
Red lights flash, horn sounds when boxes passing over this scale are underweight

an inclined power belt and fed to the weighing platform. The carton passes over a cycle start switch which activates scale mechanism. A ball-bearing, spring-loaded stop gate halts the carton in the correct weighing position.

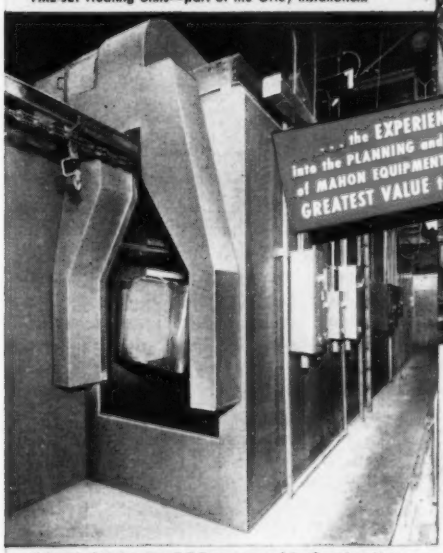
Dial indicator of the scale is "zeroed" at the 47½-lb mark, and adjusted to go no farther than 52 lb. Within 8¼ sec after the start of the trip, the cycle is completed and the weight of the box is recorded on a tape in the scale. When a carton is found to be underweight, a red light flashes at the weighing station and another red light flashes and a horn sounds in the production room. At the same time, a solenoid-operated lever performs two operations: its upper end trips a lever on the

COMPLETE *Finishing* SYSTEMS

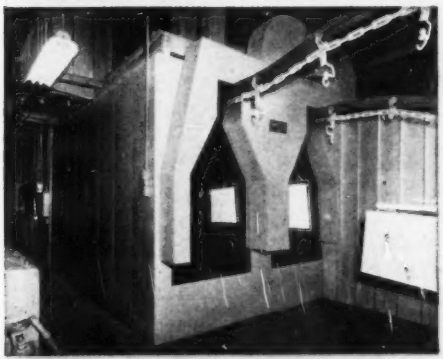
. . . for ENAMELS • LACQUER • PAINT • VARNISH



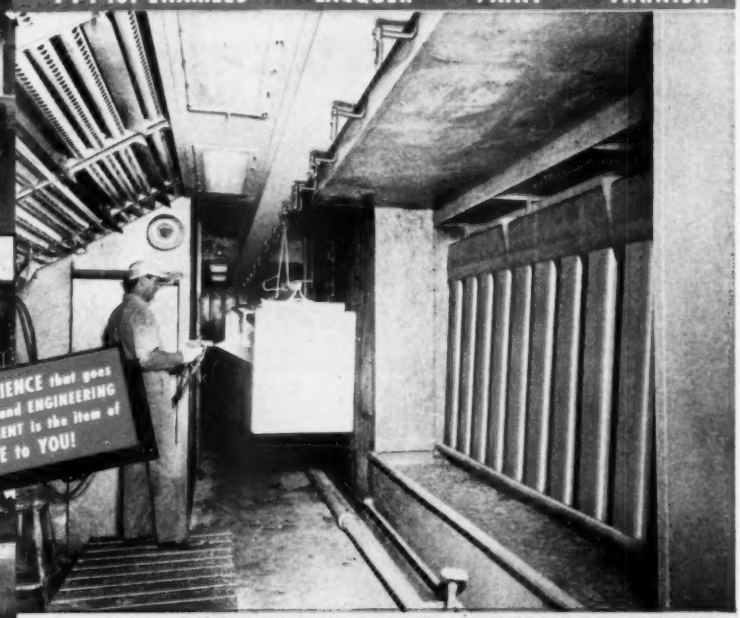
Mahon Metal Cleaning and Rust Proofing Machine with modern FIRE-JET Heating Units—part of the Orley Installation.



Exit end of Mahon Dry-Off Oven—part of the Complete Mahon Finishing System installed for Orley Corporation, Detroit.



Entrance end of Mahon Dry-Off Oven and exit opening of the Finish Baking Oven. Ovens are combined for heating economy.



Interior view of Mahon Hydro-Filter Spray Booths with HYDRAIRE Flood Sheets and Adjustable Air Flow Control which makes for excellent working conditions in Orley's Modern Finishing Department.

ORLEY HOME FREEZERS and Other Appliances Receive FINE FINISH in MAHON EQUIPMENT!

Orley Corporation, manufacturers of Orley Home Freezers, and contract painters for other appliance and automobile manufacturers, rely on Mahon Finishing Equipment to produce the quality finish demanded for their own products and for the products of their customers. Major elements of the Orley installation are illustrated here . . . it is another typical Complete Mahon Finishing System including Metal Cleaning and Rust Proofing Equipment, Dry-Off Oven, Hydro-Filter Spray Booths, and a Finish Baking Oven. The choice of Mahon equipment was a wise and logical decision . . . because, more home appliances and more automobiles are painted in Mahon Finishing Systems than all other types combined. If you are contemplating new finishing equipment, you, too, will find Mahon engineers better qualified to advise you on both methods and equipment requirements . . . better qualified to do the all-important planning, coordinating and engineering of equipment—which is the key to fine finishes at minimum cost. You will also find that Mahon equipment is built better for more economical operation over a longer period of time. Mahon's background history in this highly specialized field covers thousands of Complete Finishing Systems including Dip, Flow Coating, and Spray Equipment for every conceivable product painted on a production basis. See Sweet's Plant Engineering File for information, or write for Catalog A-654.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment. Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems and Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other units of Special Production Equipment.

MAHON

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Fyr-Fyter's KARBALOY*

...PUTS OUT MORE FIRE FASTER with LESS LIQUID and PREVENTS FLASHBACK!

HERE'S PROOF! ROARING TEST FIRE OUT...in 11 SECONDS!

*Exclusive Chemical Liquid . . . available only in Fyr-Fyter Loaded Stream INSTANT Extinguishers.

This raging inferno, with flames shooting 20 feet in the air, is an Underwriters' test fire in a 100 square feet pine panel.

When fire is highest, INSTANT'S KARBALOY LOADED STREAM is aimed at fire. The roaring blaze was killed in record time . . . 11 short seconds!

This test fire is conclusive proof of Instant superiority! Karbaloy, the extinguishing liquid developed by engineers now prominent in atomic research, killed the fire in one-third time required by ordinary extinguishers . . . and only two quarts of liquid was used! Karbaloy also fireproofs as it extinguishes . . . preventing flashback or fires in rubber and other combustible materials that start up again *after* being put out by ordinary chemicals.

Fyr-Fyter Instants are designed to stop the *most prevalent fires* in wood, rubber, fabrics and other general combustibles. They require no recharging, except after use, and need no protection from freezing. The long-range Loaded Stream can be discharged at a *safe* distance of 45 to 60 feet to fight flames that cannot be approached at close range. No other extinguisher provides the combination of advantages found in Fyr-Fyter Instant Extinguishers!

Write for details today!

TEAR OUT THIS COUPON AND MAIL WITH YOUR LETTERHEAD

☐ Send full details on Fyr-Fyter Instant Extinguisher.

☐ Send a Fyr-Fyter Representative. Let's talk it over. No obligation.

DEPT. 50 FF-3

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221 CRANE STREET, DAYTON 1, OHIO

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BRANCH OFFICES: *New York, Boston, Philadelphia, Chicago, Atlanta, Dallas, San Francisco, Portland, Seattle.*

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PLANT ENGINEERS' DIGEST

(Digest begins on page 32)

mechanical counter, thus counting the carton as under weight, and its lower end, to which is attached a crayon, marks the carton for eventual separation in the shipping room.

If the carton weighs more than it should, a green light flashes at the scale and in the production room where also a gong is sounded. The carton is counted as overweight on the remote panel board which counts all cartons electrically.

Quick action of the scales prevents any bottleneck at the weighing platform. The time interval remains constant even when the the scale detects an underweight or overweight package. *From Fairbanks-Morse News, published by Fairbanks, Morse & Co., Chicago, Illinois.*

Impact Wrench Opens Valves

PROBLEM OF OPENING HUGE gate valves, often encrusted with lime and sand deposits, at a California county water works, has been solved by the use of a heavy duty air impact wrench.

Previously, two men had to rely on a long wrench and muscle-power to move the valves and often a stem would break in the process.

With the impact tool, one man is able to operate the valves in a few seconds and is thus able to cover the entire system in a fraction of the time formerly required by the two men. The original impact of the wrench loosens the deposits and opens or closes the valves quickly and dependably. *From The Thor Scoreboard, published by Thor Power Tool Company, Aurora, Illinois.*

With impact wrench, gate valves are opened in few seconds, without strain

Beats heat in die casting machines . . .

Mr. Simon Slutsky (left), co-owner of Atlantic Die Casting Company, and Mr. L. J. Loomis (extreme right), Standard's lubrication specialist, watch machine operator use the somewhat unique spray method devised to apply SYNTHOLUBE Oil to hot and hard-to-lubricate parts of die casting machine.

● The Atlantic Die Casting Company specializes in aluminum die casting. Using hydraulic machines of its own design, this company turns out amazingly intricate parts at a high rate of production. But it was not always easy going.

There had been a problem of lubrication. The exceedingly high temperatures necessary for die casting made it difficult to lubricate machine parts in the area of the heated dies. Various expensive and complicated lubricating mixtures were tried. Under the high temperatures, the lubricants thinned and did not cling well to the hot surfaces. Oxidation of the lubricants produced deposits. Resulting troubles: sticking of machine parts, particularly ejector pins; staining of aluminum castings, down-time for cleaning.

Consulted on this problem, a Standard Oil lubrication specialist recommended the lubricant that had been developed by Standard Oil for just such high temperature applications: SYNTHOLUBE Oil.

This unique product has made short work of the lubrication troubles. It does not "run" from hot surfaces. Its unusual depolymerizing characteristic has prevented the formation of troublesome deposits. In addition to other lubricating benefits, SYNTHOLUBE has eliminated the expense of using costly lubricating mixtures.

Whatever your lubricating problem or need, you'll find that a Standard Oil lubrication specialist has the engineering ability and the petroleum product to help you. You can reach the specialist serving your area of the Midwest by phoning your local Standard Oil office. Or, write: Standard Oil Company, 910 So. Michigan Ave., Chicago 80, Ill.

STANDARD OIL COMPANY STANDARD *(Indiana)*

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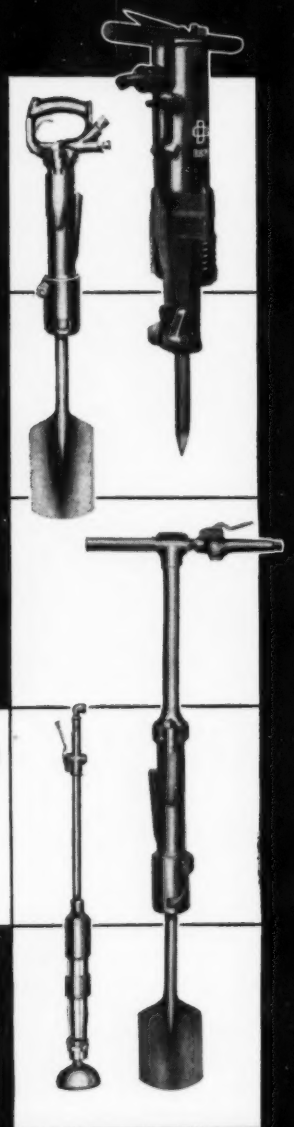
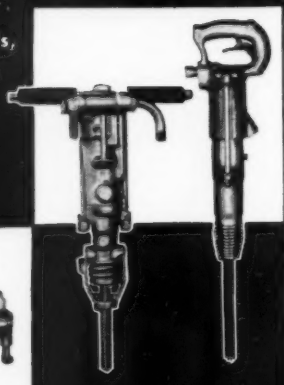
3 reasons **why** it pays to standardize on **GARDNER-DENVER air tools**



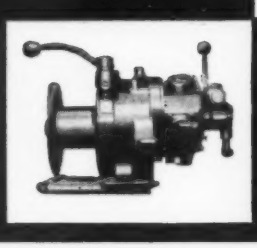
1 **they fit the job**
Field-proved for years on track and bridge work, plant maintenance and construction projects.

2 **they suit the men**
Well proportioned and correctly balanced—enable your men to accomplish more work, and with less fatigue.

3 **they stay out of the shop**
Precision design, tested materials, easily renewable wearing parts keep Gardner-Denver air tools on the job.



Write for descriptive bulletins.



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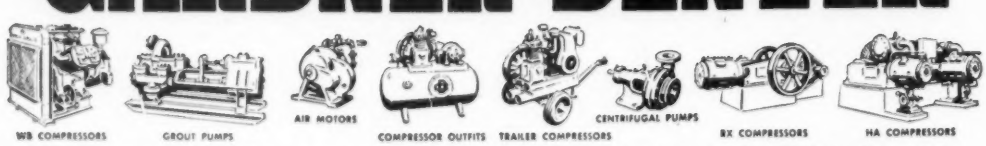

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INSUL-MASTIC is a heavy asphaltic coating, fortified with Gilsonite and reinforced with mica, asbestos and ceramic clay. It is applied in one thick coat and will prevent corrosion under extreme conditions such as acid or alkali fumes or constant moisture. INSUL-MASTIC TYPE "D" contains cork, an excellent insulator. When applied ¼" thick on heated tanks it will cut your fuel bills considerably.

We can show you applications many years old in plants where constant painting was once the rule. These INSUL-MASTIC coatings have not been renewed since they were applied several years ago. They have saved considerable maintenance money for their owners.

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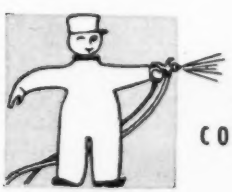
Before you build, take advantage of our consultant service. Proper coating recommendations now will prevent corrosion worries and expenses later.



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OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

Filtration Reclaims Cutting Oil

LAYING OUT a new division for production of electric windshield wipers, Auto-Lite installed a complete cutting oil filtration system for the grinders used to thread armature shafts.

Soon after the new division was in operation, production was increased, placing a heavier load on the grinders. Oil temperatures rose above the safe level, interfering seriously with grinding operations. A study by filtration engineers from the U. S. Hoffman Machinery Corp. revealed that a 2000-gal clean oil reservoir used as a cooling pool would absorb the damaging excess heat.

It was necessary to shut down the filtration system during the reservoir installation, and the necessity for clean grinding oil and controlled oil temperatures became apparent. Without continuous oil filtration and circulation, the grinding oil became extremely hot, causing a burr on the shafts. Rejects were excessively high. Production suffered, since the contaminated oil caused scratches and coarse finish on the product, and because contaminated oil shortened grinding wheel life by 50 per cent.

After the 2000-gal oil reservoir was installed, bringing the system capacity to 4780 gallons, the oil filtration system operation was resumed. Analysis of the operation showed that production increased as rejects were minimized, no oil was discarded, and grinding wheel life increased 100 per cent. The 2640 gallons of oil formerly discarded were successfully reclaimed by returning it all gradually to the system.

Equipment used in the Auto-Lite system consists of two pressure filters with a flow rate of 140 gpm each, one Hoffman Magnaflo model with a magnetic-type filter and a flow rate of 100 gpm, and one 2000-gal oil reservoir, all designed to serve four Jones and Lamson thread grinders.

Filtration cycle begins as clean oil is pumped from the reservoir to the grinding machines. Dirty oil leaves the grinders by gravity flow to the first section of the Magnaflo settling tank for settlement of the larger metal particles. The oil is then pumped through a magnetic field in the other end of the tank, to remove all remaining ferrous particles. A dual-purpose conveyor removes the sludge from the

(Continued on page 54)

Cutter Guide and Indexing Device for Sharpening Milling Cutters

SHARPENING of stagger-toothed and straight-toothed milling cutters has become an automatic function at the New London Submarine Base. A guide and positioner installed on the sharpener obviates the need for continuous attention by the machine operator during the sharpening.

Diagrammed in Fig. 2, the device consists of a base plate, 1, and three fingers, 2, 3, and 4, with the necessary locking nuts to hold them in place. The three fingers are made of flat ground stock, heat treated to a spring temper. The center finger, 3, is ground to a 20-deg angle on both sides, to correspond to the face angle of stagger-toothed cutters. All the fingers are constructed to allow vertical and horizontal adjustments for clearances.

During sharpening, the tooth of the cutter travels on top of the center finger, as in conventional grinding. The grinding machine reversing stops must be set so that the table travels far enough to allow the tooth to slide off the center finger on either side, and to index cutter to the next tooth.

The side fingers are identical and serve the same purpose. They catch the tooth just ground as it slides off the center finger, the machine reverses, and the ground tooth rides the side finger until it reaches the end. Here, externally exerted tension completes the indexing function, and the next tooth slides up the 20-deg center finger slope. Upon reaching the zenith of the finger, the tooth is sharpened. The cycle continues on each side of the center finger. The indexing and grinding therefore become mechanical as grinding continues around the periphery of the cutter.

Tension for the indexing operation is exerted on the cutter by forcing the cutter mandrel to revolve toward the indexing fingers. A length of string, wrapped around the mandrel, is put under tension by a weight suspended over the edge of the grinder. A pulley, mounted on the frame of the center stock, guides the weighted string, as shown in Fig. 3.

Fig. 1. Cutter sharpening device in position on grinder. Cutter not in place

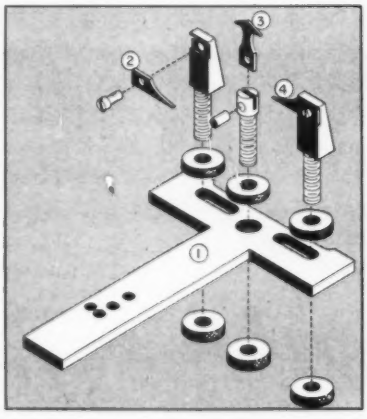

Fig. 2. Exploded drawing of indexing device shows relative positions of parts

Fig. 3. Sharpening device with cutter in place. Weighted string holds tension

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Packaged 10' lengths of Chain. Reels for 50' lengths and over.

Pitch	Roller Width	Chain No.
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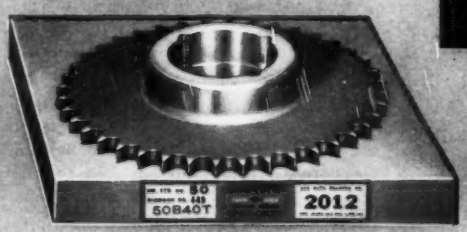
1/2"	1/4"	DIAMOND No. 41 AM. STD. No. 41
1/2"	5/16"	DIAMOND No. 66 AM. STD. No. 40
5/8"	3/8"	DIAMOND No. 449 AM. STD. No. 50
3/4"	1/2"	DIAMOND No. 433 AM. STD. No. 60
1"	5/8"	DIAMOND No. 434 AM. STD. No. 80

Finished Bore precision-made Sprockets, complete keyways and setscrews. Many bores and tooth sizes.



Taper-Lock Sprockets with replaceable bushings to meet wide range of bores.

DIAMOND ROLLER CHAINS AND SPROCKETS

The constantly increasing use of Diamond Roller Chain for power transfer has made possible the wider range of Finished-Bore Sprockets which with the Taper-Lock replaceable bushing type Sprockets for the large bores, provide stock drives to meet the vast majority of requirements.

RE-WORKING ELIMINATED

Since Diamond Finished-Bore Sprockets are complete with keyways and setscrews and are available from stock in 75 tooth sizes with more than 280 accurately finished bores—the job of re-working as required by conventional minimum bore sprockets is eliminated.

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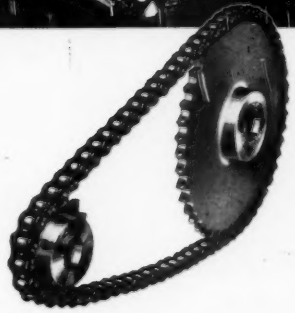


For more facts circle 543 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

bottom of the tank and also scrapes the magnet clean. The sludge is carried by conveyor up an incline to allow maximum oil drainage, and then is emptied into a disposal cart for removal.

The oil is pumped further through one of two pressure filters, equipped with fine mesh screens precoated with filter-aid powder. From here, it is returned to the clean oil reservoir, ready for recycling into the system.

Only one pressure filter is in use at a time—the other is valved into the lines for operation when the first is out of service for cleaning. Placement of the pressure filters permits sludge removed from both the Magnaflo unit and the pressure filters to fall into the same disposal cart for removal.

Scraper Sharpening Fixture

POPULARITY of carbide tipped hand scrapers for scraping bases of machine tools is increasing. Their life between sharpenings is long and no hand stoning is required.

Carbide scrapers are used almost exclusively at the Norton Co. Machine Div. plant. Here the problem of resharpening them is greatly simplified by use of a fixture clamped to a standard tool grinder using 6 in. diamond wheels.

The holder for the scraper pivots on a 10 in. radius for crowning the carbide tip and is tilted upward to grind a 5 deg negative rake on each of the two cutting edges. Accuracy and uniformity of the grind is further assured by inserting wear-resistant pieces of carbide at the various points on the holder where the scraper is supported.

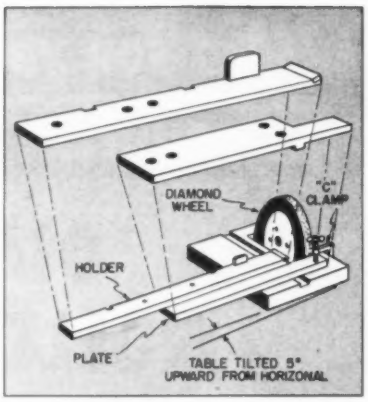


Fig. 2. Organization chart shows a break down of the many functions under each of the divisions. Basic theory back of this organization was for close coordination between these divisions

Hand scrapers are now available in the form of replaceable carbide tipped blades about 3 in. in length and 1/16 in. thickness throughout. To sharpen these blades, or the solid shank scraper the operator simply holds the tool down firmly on the holder with one hand while swiveling it slowly back and forth across the diamond wheel with the other.

Lamp Bulbs Sticking?

ALUMINUM-BASE electric lamp bulbs, subject to chemical fumes or salt spray, are likely to stick in their sockets so tightly that removal almost always results in breakage of the bulb.

This seizure, resulting primarily from the high reactivity of aluminum, can be prevented by coating the base threads of the bulbs with Aquadag, a colloidal graphite dispersion in water, manufactured by Acheson Colloids Co. The colloidal graphite lubricant reduces static friction and corrosion between base and socket, so the bulbs can be easily removed.

A good conductor of electricity, with a negligible coefficient of expansion, the graphite lubricant can be brushed on, and is readily adsorbed on the metal surface.

Glass Cloth Reproductions

GLASS FIBER-REINFORCED polyester resins have found new use in industry, serving as photo-template material. In this application, engineering departments of many industries consider the material almost revolutionary in drafting and reproducing processes.

From the aircraft, automotive and appliance industries, use of this material has spread to mapping, tooling, lofting, plane table surveying—wherever, in fact, dimensional stability must be maintained in originals, master duplicates and true-to-scale reproductions.

Here is an example of the difference in handling size of same layout. On the left is a reproduction on glass cloth and the other is drawing on metal

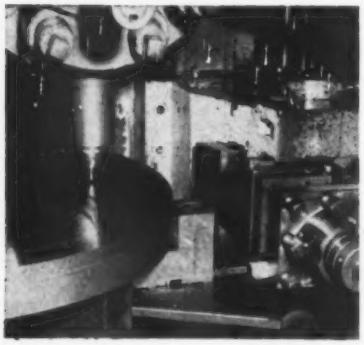
In the aircraft industry with its constant use of huge templates, applications verge on the spectacular. A 4 by 12 ft reproduction formerly made on the painted surface of an aluminum or steel sheet of that size now requires merely a roll of the new material no bulkier than a window shade, doing away with problems of bulk, weight, shipping and storage, not to mention the saving of sometimes critical metal.

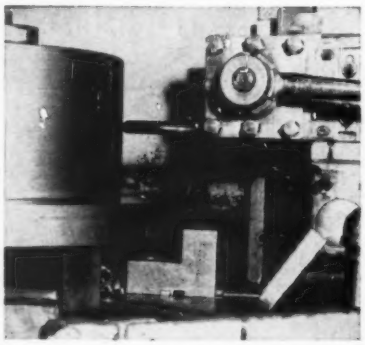
The new template material, developed by Tru-Scale Engineering Supply Co. of Wichita, Kansas, is made by impregnating cloth woven from continuous glass fibers with a blend of Paraplex polyester resins. The result is a sheet material with dimensional stability equal to or better than that of the metal it replaces, but with transparency greater than that of tracing paper.

Making copies for sub-contractors, for example, engineering departments working from metal sheet had to use costly projection cameras. This method involved time delays, often introduced

Layout for Hole Drilling Indexed on Vertical Boring Mill Table

Contributed by Stanley Sankes, The Carborundum Company



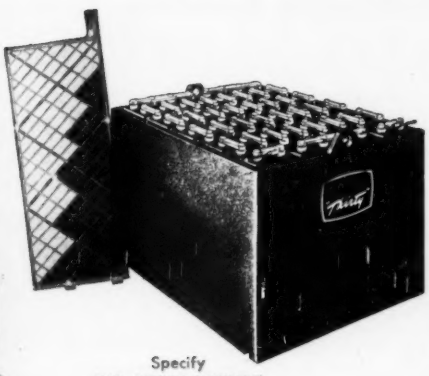


After machining discs or cylindrical sleeves in vertical boring mill, hole layout for drilling can be done by using machine scales. Center punch is mounted in the turret or slide tool holder, and 90 deg increments indicated on the machine

Plenty of Reserve Strength

THANKS TO BATTERY POWER!

There's nothing like battery power for rough, tough industrial truck service. Only battery power gives you the extra reserve to meet the stringent demands for higher lifts, faster maneuvering and continuous all-day operation. And the Gould "Thirty" with new Diamond "Z" Grids has the unique features of design that give you extra battery performance and longer battery life . . . make your trucks work harder and longer.



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THE GOULD "THIRTY"
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OPERATION—PRODUCTION

(O and P begins on page 52)

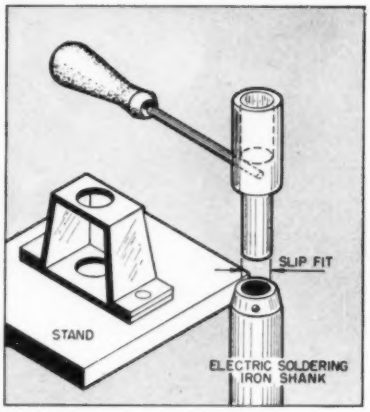
troublesome inaccuracies, and required skilled technicians.

In contrast, a polyester glass cloth template can be copied without distortion on a relatively inexpensive contact printing table in which vacuum holds the original firmly against the copy. Such work can be done competently by non-technical grade personnel.

Silver emulsions, Diazo or any of the usual sensitizing materials may be used. Drawings made on metal plates can be copied rapidly on the sensitized glass cloth by reflex printing.

Dip Pot for Solder

Contributed by C. H. Willey



Melting pot uses soldering iron as heat source, provides solder for small jobs

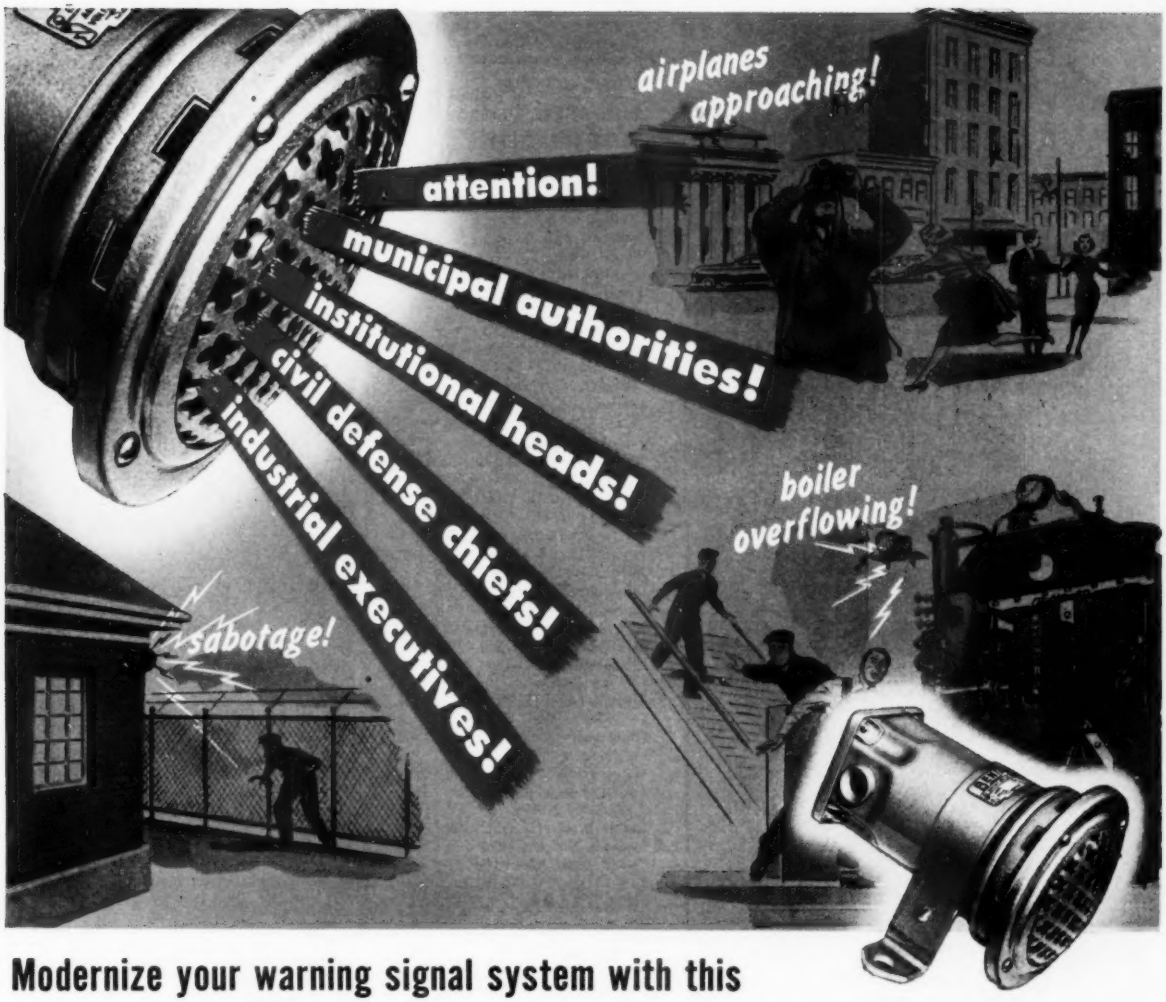
DESIGNED IN OUR SHOP for use as a handy soldering tool, a small brass pot was fitted with a handle and machined to fit into the shank of an electric soldering iron. Maintenance electricians find it useful for solder melting and wire splice dipping.

Portability of the pot provides a ready supply of solder for on-the-spot wire splicing work. Easily-made stand holds the pot upright when not in use.

Dispenser for Hot Rosin

INSULATION of screw heads on switchboards and controller panels has been simplified by a shop-designed rosin dispenser. Developed at the Charleston Naval Shipyard, the device is essentially a small metal tank containing an electric heating element.

Conical in shape, the bottom of the tank is tipped with a nozzle for pouring the rosin. A valve rod, lifted by depressing a thumb-operated lever on



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NEW extra-compact yet powerful siren!

It's the 20TH Century Pony Express!

...Sounds the Alarm Against such Enemies as: Slowed-up Production, Sabotage, Fire, Air Raids, etc.

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The modern trend towards the use of a number of small-yet-powerful signals instead of trying to obtain satisfactory coverage with one bulky 2 to 5 h.p. device, calls for a review of your warning signal system. The new Benjamin Siren is especially engineered to help modernize your system in line with latest approved sound signal practices. It features extra-compact design due to its small-yet-powerful high-torque, 10,000 r.p.m. motor and precision-machined, compact housing. Famous Benjamin built-like-a-battleship construction prevents moisture from entering and assures long, trouble-free operation.

The new Benjamin Siren is one of many Benjamin Signals which help you modernize your signal system. All of them are shown and described in the 48-page Signal Book, which also includes signal application data, glossary of signal terms, details on how to set up a system, and other valuable information to help you modernize your signaling. Send for your copy now...there is no cost or obligation.

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SNAP-ON TOOLS CORPORATION, 8068-D 28th Ave., Kenosha, Wisconsin

For more facts circle 547 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

Operating position of hot rosin dispenser. Pressure on lever starts flow

the handle of the dispenser, opens and closes the nozzle opening for delivery of the rosin.

A small stand, constructed of strap iron, with its base cupped to serve as a drip pan, holds the dispenser in an upright position when it is not in use.

Exhaust Duct Flexes to the Job

FLEXIBILITY was the keyword in the polishing and buffing operations at the A. S. Campbell Co., makers of automobile accessories.

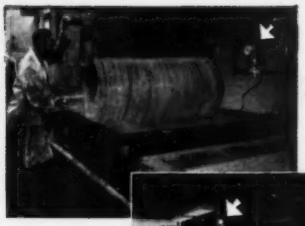
To polish bumper guards after they are stamped to shape, 45 polishing machines were used. Arranged in three "lines" the machines were so adjusted that each polishing wheel rode on a different section of a bumper guard as it moved along the line.

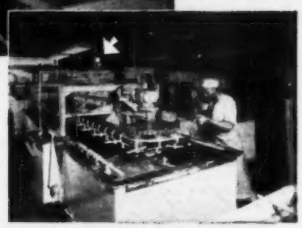
Exhaust ducts served each of the 45 polishing machines, and metal ducts from the hoods to the header had proven unsatisfactory in operation. Each machine was counterbalanced to ride over the surface of the guards smoothly, following the contours of the metal part. The metal ducts, although flexible, became stiff and unwieldy after some months of use, and tended to stiffen the operation of the buffing wheel carriage. Low spots in the guards were being skipped by the wheels, as the duct failed to flex sufficiently to let the wheels drop to follow the contours.

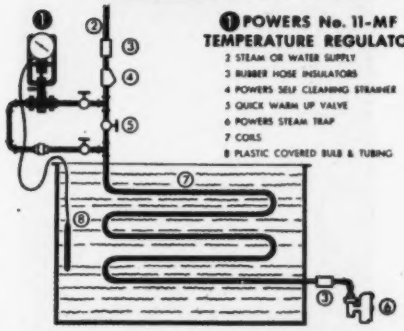
Flexible duct sections, made by Flexible Tubing Corp., of neoprene-

Cut Cost of Metal Finishing Processes

and Get Better Quality Products



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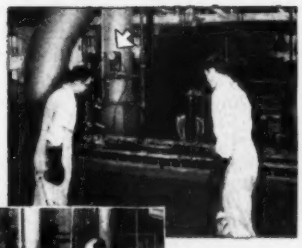

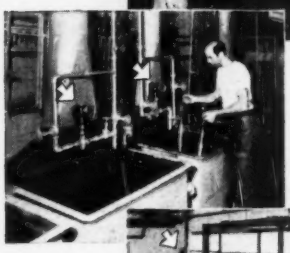

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Easy to read 4" Dial Thermometer indicates temperature of solution under control. It gives a visual check of the process and makes it easy to adjust regulator for different temperatures.

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OVER 60 YEARS OF AUTOMATIC TEMPERATURE CONTROL

For more facts circle 648 on Reply Card

PROBLEM:
excessive vibration in exhaust fan delivering dust-laden air to cyclone. Fan operated smoothly a number of years, but gradually developed vibration and finally damaged the bearings.

SOLUTION: Fan Wheel found to be far out of balance due to uneven buildup of slightly moist dust particles on blades. Fan rotor had never been cleaned, and had condition been permitted to continue, further bearing troubles and a sprung shaft might have resulted. "Buffalo" representative advised owner to clean rotor every six months, then check wheel balance. Fan has since operated smoothly with no further bearing trouble, and at greatly reduced noise level. NOTE: all "Buffalo" fan rotors are balanced both statically and dynamically on precision balancing machines at the factory. Regular periodic cleaning and repainting followed by a balance check will assure added years of smooth, efficient performance.

This is one of thousands of problem-solution case histories accumulated in "Buffalo" files during our 77 years of building air handling equipment and solving air problems for industry.

Call your nearest Buffalo Engineering Sales Representative—get the benefit of his factory trained "know-how" and experience to help you solve your air problems.

BUFFALO FORGE COMPANY
166 MORTIMER STREET BUFFALO, N. Y.

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

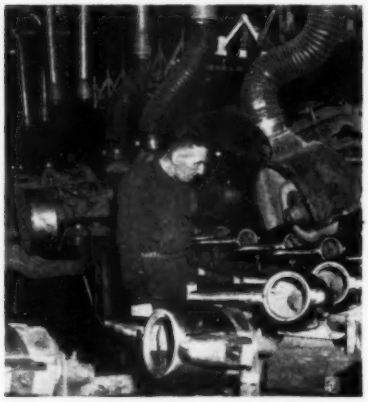
VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

For more facts circle 549 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

coated fabric on a spirally-wound wire framework, are providing the needed flexibility with no stiffening or friction-producing sliding of metal surfaces. The exhaust duct to each machine was cut, approximately 2½ ft



Buffing wheel rides over each metal part. Tubing lets the wheel move freely

from the buffing wheel hood, and the neoprene section installed. Maneuverability of the sections permits unrestrained movement of the wheels.

Installation of the flexible sections has increased production by 10 per cent, and reduced consumption of the buffing wheels by 15 per cent.

New Fuel, No Fumes from Truck

EXHAUST-FUME air contamination from a gasoline-powered lift truck was a particular personnel problem at the Glendale, L. I., warehouse of Gerber Foods, Inc., because of the small size of the warehouse.

With only 10,000 sq ft of floor space in the single-story warehouse, which houses cartons of baby food products stored in palletized loads, the air was easily fouled by the exhaust from the truck.

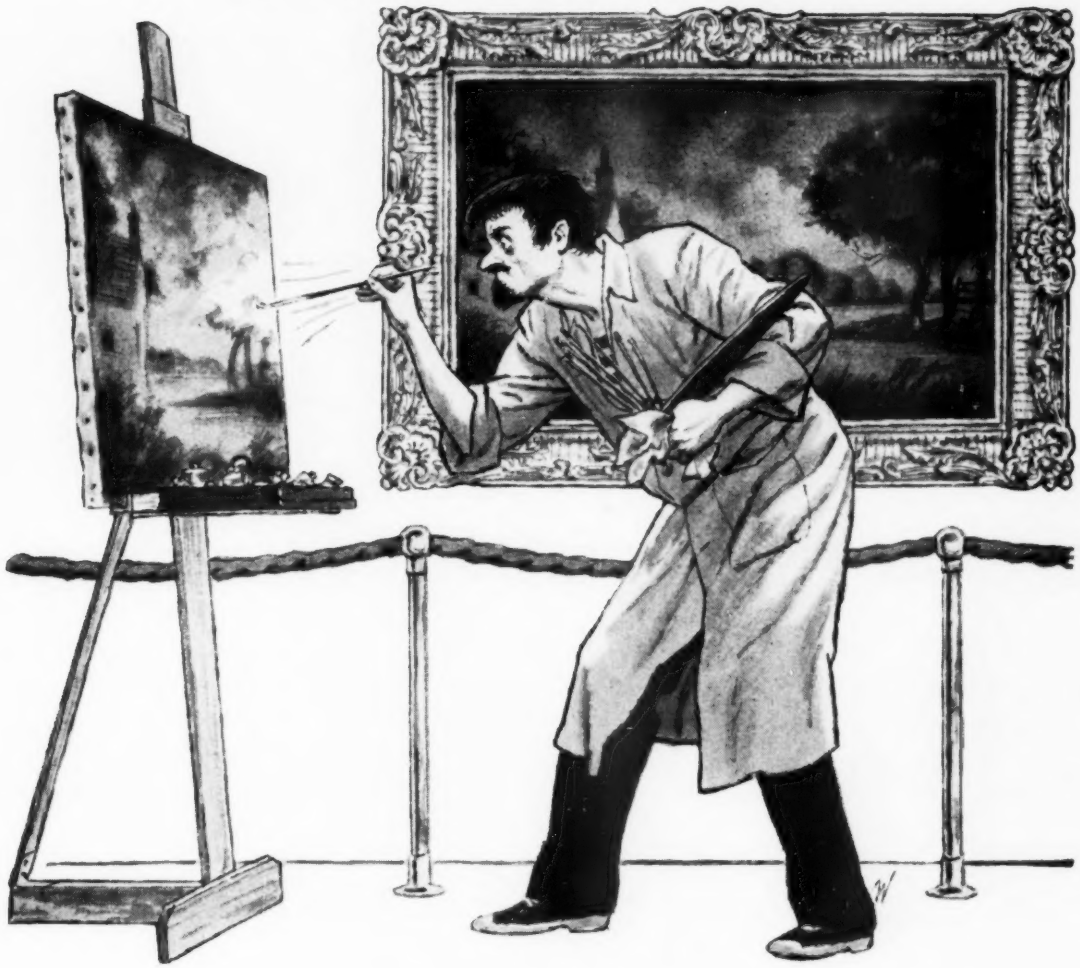
Conversion of the 4000-lb capacity Clark truck, to burn liquefied petroleum (LPG) as fuel has solved the problem of fumes, and at the same time has improved the operation. According to Gerber's warehouse superintendent, the LPG-powered truck requires less servicing, yet performs as efficiently as when it was gasoline-powered.

Conversion was a relatively simple job. Adding a vaporizer and mounting a bracket to hold an 8-gal tank were the only major changes necessary.

One tank of liquefied gas lasts three

BOTH ARE OILS—

BUT ONE'S A MASTERPIECE!



In Lubricating Oil, too, there's no substitute for Quality!

"Look-alikes"—in lubricating oils as in oil paintings—can fool you. But they can't fool a machine. Famous Gargoyle oils prove this point.

You can copy the physical specifications of a Gargoyle oil, but you can't copy the 88 years of experience and skill that transform these specifications into products of unsurpassed quality. Vary the ingredients or the way they're compounded even slightly, and you wind up with an oil that, at best, may do no harm. But neither can it possibly bring you the benefits the original was designed to deliver.

This *inherent quality* is only part of the Gargoyle picture. With it goes the world's greatest lubrication engineering service. We analyze your plant machinery—work with your personnel to set up a complete program of *Correct Lubrication* that will improve your production, cut maintenance costs.

Why accept substitutes for *your* plant?

SOCONY-VACUUM

SOCONY-VACUUM

Correct Lubrication

FIRST STEP IN CUTTING COSTS!

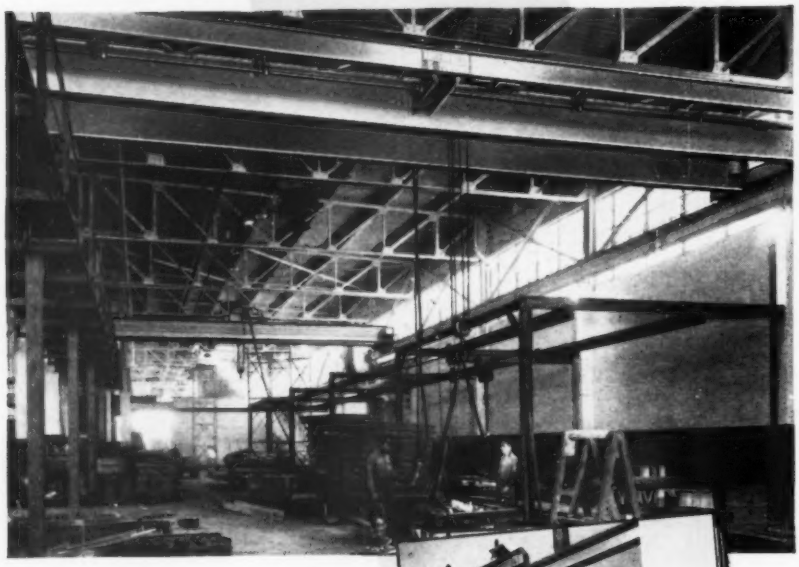
SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

For more facts circle 550 on Reply Card

When considering Industrial Cranes in Capacities up to 15 Tons . . . Be Sure You Have the Facts About . . .

CRANEMASTER

TOP QUALITY . . . LOW COST!



No other overhead cranes of comparable quality are more conservatively priced or more dependable in operation. This explains why the **Cranemaster** is used in so many plants to STREAMLINE PRODUCTION and PARE DOWN COSTS . . . also why so many firms specify Abell-Howe Cranes again and again. Some are using 5, 10, even 20 and more of these service-proven units—because they have found them economical to buy . . . to operate . . . to maintain.

We invite you to make a check and comparison of our specifications and quotation to find just how much your crane dollar actually can buy at . . .

Ask for a copy of our NEW Cranemaster Catalog No. C114

ABELL-HOWE COMPANY

53 West Jackson Blvd.

CHICAGO 4, ILLINOIS

For more facts circle 551 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 52)

Truck driver demonstrates method of connecting new fuel tank to fuel line

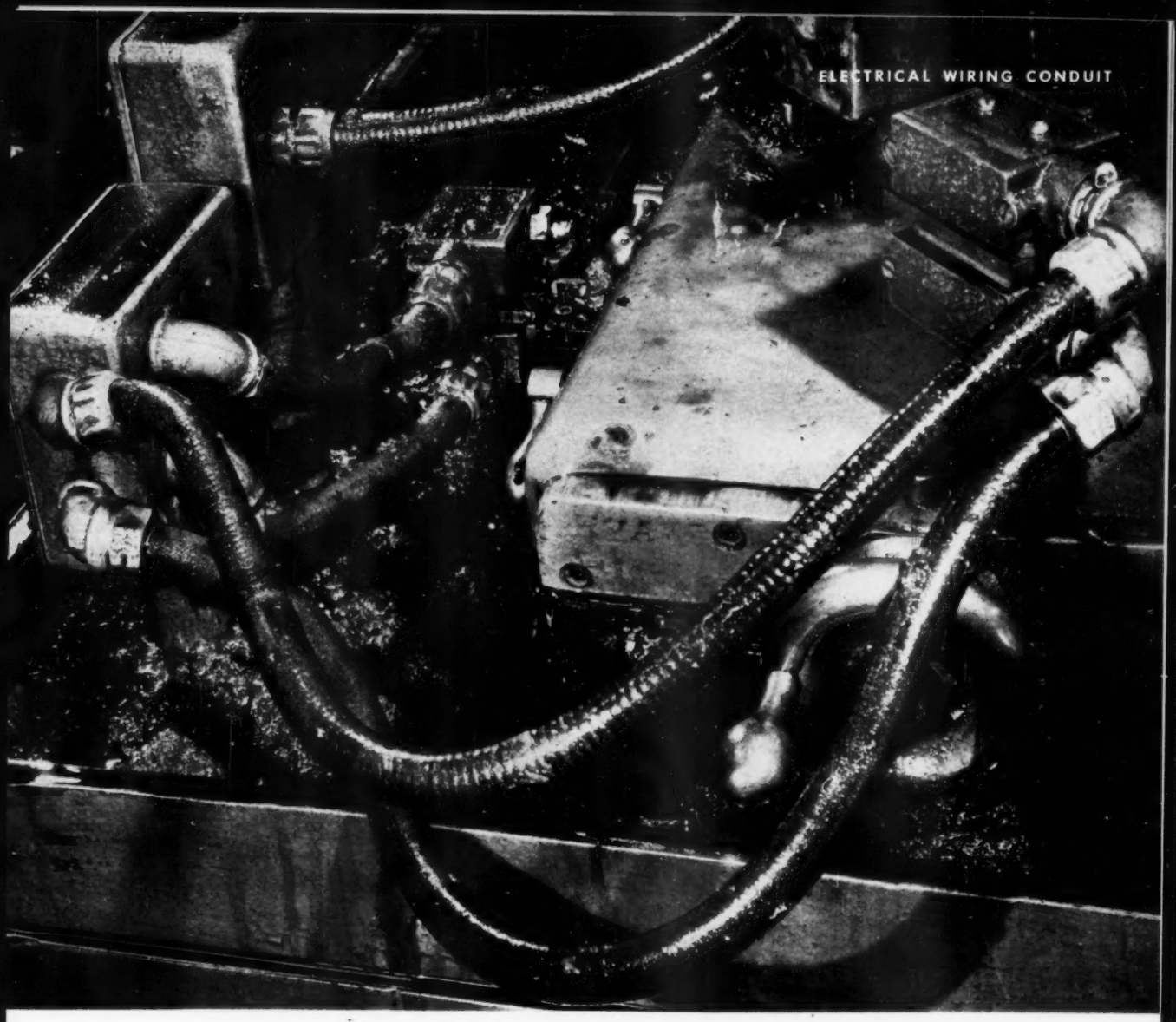
or four days, and refueling requires only replacement of an empty fuel tank with a full one, which takes less than five minutes of the truck driver's time. He merely removes the slip-off valve on the supply line, unbuckles the strap that holds the tank on the truck, and removes the tank. A full tank can be quickly installed.

Recitifier In, Diesels Out

SAVINGS RESULTING from the recent installation of a mercury arc rectifier have been over $1,000.00 per month at the main shops of the New York, Ontario & Western Railroad at Middletown, N. Y. The rectifier unit, manufactured by the General Electric Co., replaced two diesel generator sets that had been supplying power to the shop.

Compactness of the rectifier enabled the railroad to put the unit in half the space required for the old equipment. Taking advantage of this space reduction, one of the diesel generator sets was removed, the rectifier installed in its place and put in operation, and the second generator set was then turned off. No interruption of power was necessary to make the changeover.

For maximum savings, the rating of the rectifier was closely applied to the power requirements of the shop. With overload capacity sufficient to handle peak loads, the installed capacity was designed lower than had been required with the diesel sets. Largest factor in the cost reduction was the automatic operation of the rectifier, obviating the constant supervision by operating personnel that had been necessary with the old generators.



PRODUCTION GRINDER IS TOUGH TEST for wiring conduit. SEALTITE passes easily...protects against grinder dust, oil, coolant, and movement.

Tough synthetic cover on this conduit keeps these control wires working

IT'S SEALTITE* ELECTRICAL WIRING CONDUIT . . . PROTECTION AGAINST ENEMIES OF WIRING

SEALTITE was made to handle trouble. Oil and grease. Weather, water and dirt. Chemicals, corrosive fumes and salt spray. None gets by SEALTITE's synthetic jacket. Wiring can't be damaged. Protection is complete.

But SEALTITE offers more than just toughness. It is light and flexible. It installs easily in cramped spaces. It absorbs vibration—takes movement. And it hugs motor contours . . . looks neat.

Liquid-tight SEALTITE is the first conduit of its type to be approved by Underwriters' Laboratories, Inc. for use where exposed to moisture and mineral oils. (See N.E. Code, Art. 351.) For tight bends on machine tools and industrial equipment, use SEALTITE Type EF (Extra Flexible). It meets standards set by J.I.C.

Electrical wholesalers stock both types in coils. Buy it this way; then cut without waste. Wholesalers also stock standard liquid-tight fittings for use with SEALTITE.

*Trademark 54173

SEALTITE

flexible, liquid-tight electrical conduit

an ANACONDA® product

For more facts circle 552 on Reply Card

The American Brass Co., American Metal Hose Branch, Waterbury 20, Conn.
Please send me descriptive booklets on SEALTITE Electrical Wiring Conduit.

NAME.....
(PLEASE PRINT)

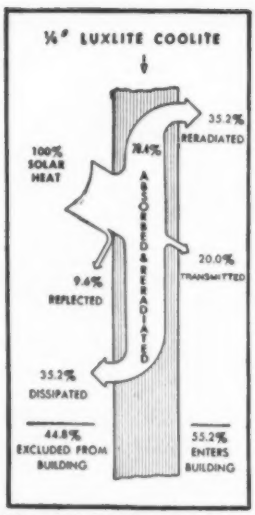
COMPANY.....

STREET.....

CITY..... ZONE..... STATE.....

Glare kills care!

COOLITE GLASS CONTROLS "RAW SUNLIGHT" ...PROTECTS PRODUCTION AND MORALE



Schematic diagram shows what Coolite does to the sun's heat. Distribution and control of light, itself, is effected primarily by Mississippi's special Glare Reducing finish.

Blinding glare reflected from any surface makes accurate work almost impossible... any task difficult. And the accompanying excess solar heat of "raw sunlight" through ordinary glass creates uncomfortable working conditions that can adversely affect output and morale.

Don't let raw sunlight flood your factory with fatigue... tiring, eye-straining illumination and energy-sapping excess heat. Coolite, the heat absorbing and glare reducing glass by Mississippi, floods work areas with copious quantities of conditioned, natural light at low cost. Coolite-controlled lighting is comfortably different, cool and clean. Workers see better... feel better, work better in plants using Coolite, the glass that helps fight eye fatigue and cuts costly mistakes.

In your plans for new industrial buildings or in modernization projects, it will pay you to find out how Coolite can increase efficiency and economy. Translucent, light diffusing, figured and wired glass by Mississippi is available from your nearby supplier in a wide variety of patterns and surface finishes, all "Visioneered" to distribute light to best advantage.

Send for free catalog, "Coolite Heat Absorbing and Glare Reducing Glass." Samples on request.

MISSISSIPPI *Glass* COMPANY

88 ANGELICA ST. SAINT LOUIS 7, MO.

NEW YORK • CHICAGO • FULLERTON, CALIF.

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

For more facts circle 553 on Reply Card

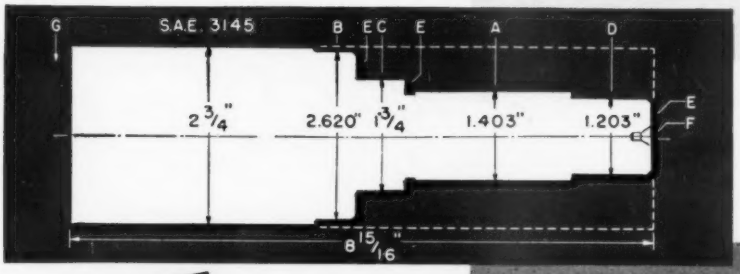
This is the difference High Velocity Turning makes

IN 1950 this job took...

12.40 min.

FLOOR TO FLOOR

A. Turn 489 RPM — .011 feed
B. Turn 340 RPM — .022 feed
C. Turn 489 RPM — .011 feed
D. Turn 489 RPM — .011 feed
E. Face end, shoulders & neck 489 RPM — .0055 feed
Chamfer
F. Center drill
G. Cut off 82 RPM — .0035 feed H.S.S.



IN 1954 this same job takes...

5.40 min.

FLOOR TO FLOOR

A. Turn 694 RPM — .022 feed
B. Turn 694 RPM — .022 feed
C. Turn 694 RPM — .022 feed
D. Turn 694 RPM — .022 feed
E. Face end, shoulders and neck — 694 RPM — .055 feed
Chamfer
F. Center drill
G. Cut off 489 RPM — .0025 feed

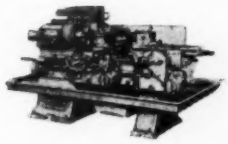
J & L TURRET LATHES GIVE...

MORE Ease of Operation
MORE Power Transmission
MORE Rigidity
MORE Accurate Stops
MORE Efficient Lubrication
MORE Coolant on Cutting Tools
MORE Accurate Results

Visitors who attend J &L's periodic "Production Studies" Seminars see this job turned out in just 5.40 min. on a Jones & Lamson #7A Universal Turret Lathe.

Only with lathes like this, built with plenty of power and the beef to back it up, can your shop take full advantage of the quality, productivity and lower costs offered by High Velocity Turning.

This job is one of the many turned at high speeds on our production line. Come to Springfield and see for yourself. At any rate, send for catalogs #101-A and #102.



JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 524 Clinton St., Dept. 710, Springfield, Vt., U.S.A. J&L MACHINE TOOL DIV.

For more facts circle 554 on Reply Card

Continental Motors Corporation
*Muskegon Plant, Muskegon, Mich.

Grease-lubricated motors at this Continental Motors plant* *defy wear with*

SHELL ALVANIA GREASE

The Muskegon Plant of Continental Motors Corporation runs thousands of electric motors under extremely varied conditions . . . on Shell Alvania Grease. In addition to outstanding wear reduction, Shell Alvania is effecting savings by cutting down inventories, bookkeeping and storage space.

Other plants from coast to coast are getting the same outstanding lubrication at greatly reduced cost with Shell Alvania Grease.

Look at these advantages:

Shell Alvania Grease pumps freely in cold temperatures, yet will not run out of bearings under excessive heat.

Shell Alvania Grease has extremely high oxidation stability.

You'll find that Shell Alvania Grease extends time between greasings . . . a substantial saving in labor and grease.

Simple inventory . . . just the one grease to stock and apply.

Why not let us show you how Shell Alvania Grease can give you a more efficient lubrication program with greater economy. For further information write to Industrial Lubricants, Shell Oil Company, 50 West 50th Street, New York 20, N. Y.—or 100 Bush Street, San Francisco 6, California.

SHELL ALVANIA GREASE

The True Multi-Purpose Industrial Grease

SHELL

For more facts circle 555 on Reply Card

COURT DECISIONS — a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Terms of Employment

A California pulp plant, in need of experienced pulp mill workers, advertised for applicants in a southern trade paper. An application for employment was received from an Alabama resident who had had 20 years experience in pulp mill work, nine of which had been spent as recovery plant foreman.

Assured by the agent of the plant that he would have permanent employment the applicant moved his family from Alabama and reported for work on the 15th of the following month. At that time he was told that all the salaried positions had been filled but that he could select any job he wanted at reduced pay until the new mill, then under construction, was completed. Upon completion of the mill no change was made in his employment and the employee sued for damages for breach of contract.

He recovered a judgment for $2,523.25 which the Federal court affirmed with the comment,

"A contract for permanent employment is only a contract for an indefinite period of time and terminable at the will of either party unless it is based upon some consideration other than services to be rendered. In this case this man comes within the exception. He moved himself and his family from Alabama to California and worked for nine months at an inferior job, all pursuant to an express understanding that he would do so as part of arrangement for permanent job."

Adequate Assistance to Employees

A Missouri plant was held liable in $2,000 damages for injuries suffered by an employee from lack of adequate assistance. This workman was directed to repair the broken frame of a tractor and place the broken parts in line for welding. In attempting to pry the parts into place with a crow bar while standing on the tractor frame, he slipped and fell, with hernia as the consequence.

Two men instead of one should have been assigned to the job and this employee had asked for assistance which was refused. The judgment in favor of this employee was affirmed by the United States Court of Appeals with the statement,

"The employee was called upon to do the work. It was a hurry-up job. It was manifestly a job which should not have been undertaken by one person. It is the unquestioned law that it is the duty of the employer to furnish a sufficient number of men to do the work in which this employee was engaged with reasonable safety to the employee and his co-laborers.

"The employee's duties did not impose upon him that of hiring or employing men and it is clear that he had no authority to compel others to assist him. The law makes it incumbent upon the employer to exercise ordinary care not only to furnish his employees with a reasonably safe place to work but also to furnish a sufficient number of men to work in reasonable safety."

Pollution of Water

An Iowa plant employing molasses in the manufacture of its product, dumped whatever was unfit for use into a ditch from which it seeped into a well supplying drinking water to a dwelling house 85 yards away.

The plant appealed from a judgment for $800 in damages awarded this adjacent owner against this plant and in its affirmance of that judgment the Supreme Court of the state said,

"It seems to be a well established general rule, supported by the great

weight of authority and followed even in jurisdictions which adhere most strictly to the common law rule of absolute ownership in percolating waters, or lack of ownership, that one who by permitting pollution contaminates the underground source supplying water to his neighbor's well or spring, commits an act for which he may be required to respond in damages."

Destruction of Plant Not Conforming To Zoning Ordinance

A rubber manufacturing plant was located in a New Jersey residential district of 12,000 people, one family houses, a few stores, a small woolen mill employing less than 50 people and a wood working plant with two employees.

A zoning ordinance adopted three years after the establishment of this plant classified the property on which this plant was located as a residential zone but plant operations were continued as a non-conforming use.

A year after the adoption of this ordinance the plant was completely destroyed by fire and although two of the walls remained standing a complete rebuilding would be necessary to resume operations. The intention of the owners of this plant to rebuild was met by an action to restrain them from what was claimed to be a violation of this zoning ordinance.

A statute in that state provides, "Any non-conforming use or structure existing at the time of the passage of an ordinance may be continued upon the lot or in the building so occupied and any such structure may be restored or repaired in the event of partial destruction thereof.

"The cost of structural alterations in such building shall in no case exceed 50 per cent of its assessed value nor shall the buildings be enlarged unless the use therein is changed to a conforming use."

In granting an injunction against the rebuilding of this plant the New Jersey court said,

"The spirit of the Zoning Act has been to restrict rather than to increase non-conforming uses and authority to vary the application of the general regulation should be sparingly exercised."

Zoning Extension Authorized

A bearing manufacturer in Connecticut asked for a rezoning of the industrial area in the town where it had located its plant, to include an additional 57.3 acres.

The application was granted by the zoning commission and an appeal taken from this ruling on the contention that the action was not according to a comprehensive plan and that there had been no change in conditions since the original establishment of the zones in the town.

In its answer to this contention, Connecticut Supreme Court said,

"It is true that the general statutes require that all zoning regulations be in pursuance of a comprehensive plan which will operate to promote the general welfare rather than individual personal advantage. The statute also provides, 'Such regulations shall be made with reasonable consideration as to the character of

COURT DECISIONS

the district and its peculiar suitability for particular uses and with a view to encouraging the most appropriate use of land throughout such municipality.

"These principles control the action of the zoning commission with reference to a proposed change of zone as well as with reference to the original zoning. Obviously a comprehensive plan for zoning in the town, as in most municipalities, contemplates that provision be made for zones in which heavy manufacturing shall be permitted. Any extension of such zones which is reasonably necessary to provide space for manufacturing is within the comprehensive plan.

"This is not a case of spot zoning. It is not an attempt to wrench a single small lot from its environment and give it a new rating that disturbs the tenor of the neighborhood. It is merely an extension of a zoning already established. Such an extension if it is in accord with the comprehensive plan and the general welfare, is proper."

Zoning Ordinance Unreasonable

Land in Detroit, Michigan, on which had been erected a manufacturing plant, was later zoned by a city ordinance restricting its use to one family dwellings and other noncommercial uses. In an action to prohibit the enforcement of this classification by the plant it was contended that the property was worth much less for residential than for manufacturing purposes.

The Michigan court, holding that the owner of this plant could not be deprived of the use of the property for the purpose for which it was adapted, said,

"Restricting the use of this property to the purpose contemplated by the classification under which it has been zoned would as to such property be unreasonable and hence not permissible.

"To deny the owner the right to continue the use that it is now making of its property would be unreasonable, an improper application of the zoning ordinance and a violation of constitutional rights."

Water Pollution Forbidden

A kaolin refining plant in Georgia diverted the water of a stream used in processing clay, returning the water to the stream below a dam, saturated with dirt, chalk and chemicals. The adjacent below stream owner asked an injunction from the Georgia court against this pollution, claiming that the waste filled the river channel, overflowed the river and destroyed the use of the land as a farm.

Forbidding the continued pollution of the water by the processing plant the Georgia Supreme Court in its decision said,

"The right to have a natural water course continue its physical existence upon one's property is as much property as is the right to have the hills or forests remain in place. The refining company in its operation of the plant was continuously adulterating and polluting the water of the stream passing through the land of the down stream owner and continuously injuring this land by filling up the channel of the stream."

The court supported this decision with a reference to an early case in that state in which the same court had said,

"The principle is that while water is on the land it belongs to the owner of the land yet he cannot so use or adulterate it as to interfere with the enjoyment thereof by the next owner and if he does so he is liable in damages for so using it."

Contributory Negligence of Employee

Five men were engaged in unloading a shipment of large transmission line poles from a flat car. In this shipment were 38 poles, each 55 ft long and weighing about 3,000 lb.

The poles were piled 6 ft high on the car and strapped together with 3 metal bands 2 in. wide and ⅛th in. thick, drawn taut around the bundle and sealed by a machine. On the top of this pile were 6 or 7 additional poles bound together in this same manner.

One of the crew cut these metal bands with an axe while the others stood at a distance expecting the poles to roll from the car when released. They waited ten minutes then one man climbed on top of the

pile and cut the bands holding the smaller bundle of poles at the top of the load.

At the cutting of the last band the poles tumbled from the car carrying the employee with them and crushing him under their weight.

In holding that there could be no recovery for the man's death the court said,

"In this case the action of an employee in mounting upon the load of poles from which practically all support except the two bands on the top bundle had been cut and walking and standing upon the top of the precariously cohering load while he cut the first and then the last one of these bands entailed great danger.

"Such danger was apparent. If the proper unloading method had been followed and proper tools used no such risk would have been involved in the unloading. Contributory negligence in the unloading was so plainly demonstrated that only one conclusion could be fairly drawn. It was attributable to the unloaders and not to the employers who had nothing to do with the unloading. There was negligence contributing to the accident. It was not the negligence of the employers or in any wise attributable to them.

"It cannot be questioned as to all such operations that a safe method must be adopted and proper direction and efficient tools supplied by any one who contracts for and undertakes performance. The workmen on the job must also use due care and may not recover for damages without showing themselves to have been free from contributory negligence."

Cement Plant Operation

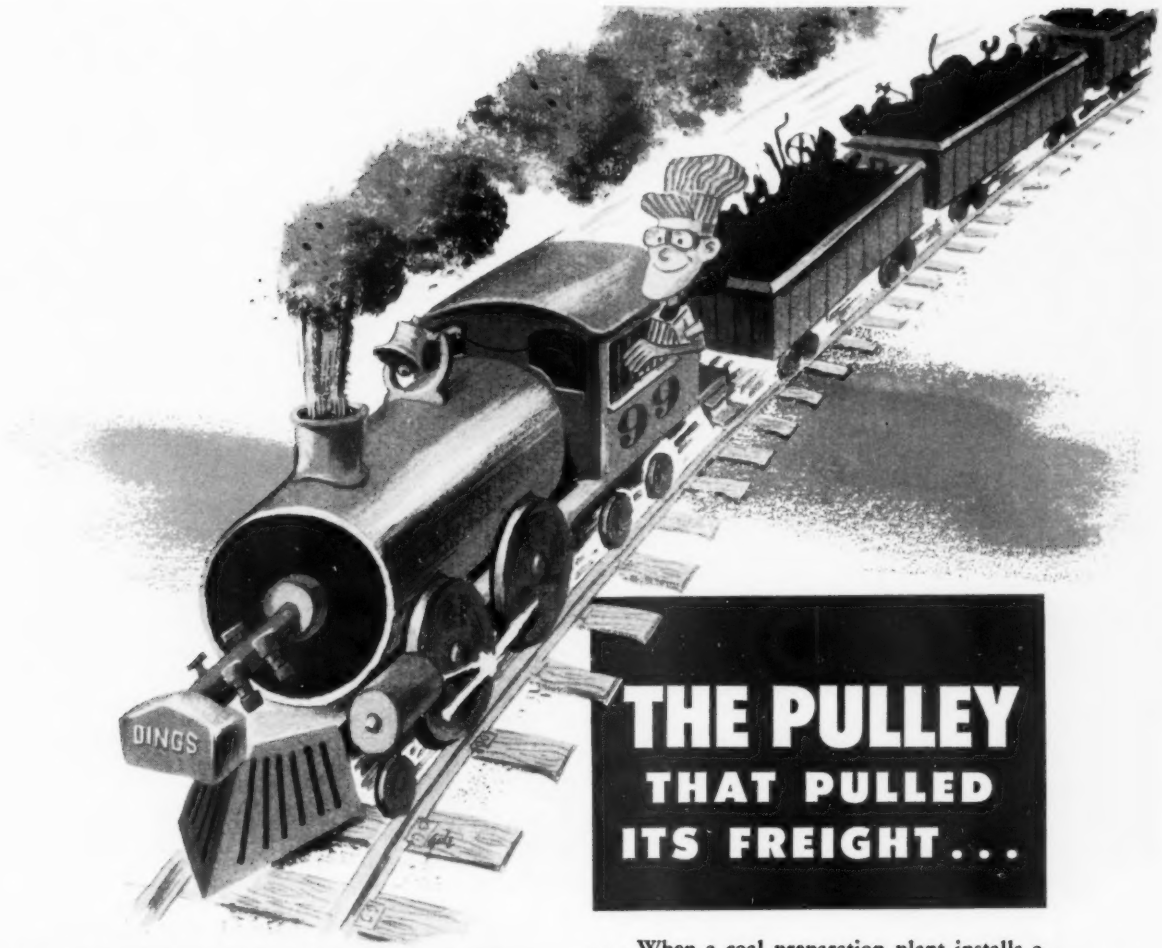
A resident of a city in the state of Washington sued for damages and an injunction against the operation of a cement plant. The plant had been in operation over 25 years before the dwelling of this complaining resident had been constructed.

In the decision of the Supreme Court of that state that this house owner had no grounds either for an injunction or damages against this plant, the court said,

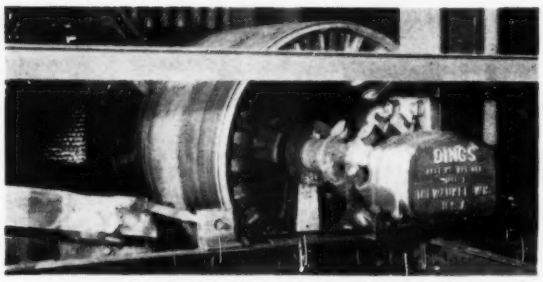
"That a certain amount of smoke, fumes, gases and noises will necessarily be produced and emitted by manufacturing plants is inevitable but that persons who dwell near manufacturing plants, like persons who dwell near railroads, or on busy city streets, must put up with a certain amount of resulting annoyance and discomfort, is self evident.

"The prosperity of an industrial community depends on its industrial activities and it would be inconsistent with sound public policy to prohibit these activities at the behest of a comparative few who were annoyed thereby.

"Every form of industrial activity has its disagreeable factors. Industries, like individuals, have 'the defects of their qualities.' In mining and manufacturing communities people must expect that ther homes will be more difficult to keep clean. than if they lived in an agricultural A certain amount of noise also is inseparable from industrial activity."



THE PULLEY THAT PULLED ITS FREIGHT . . .



This is the pulley that pulled its freight—amortized itself in 10 years while giving its owner an annual profit of more than $3.00 by salvaging its costs plus in scrap iron.

. . . When a coal preparation plant installs a magnetic pulley to protect equipment against bolts, spikes, cutter bits and other stray iron, the pulley is expected to cost something. But, a West Virginia producer found that his Dings Magnetic Pulley recovered scrap iron and tools of sufficient value (about $243 a year) to pay maintenance, power and depreciation costs ($239.64)—and show an annual cash profit of more than $3.00! Now the Dings pulley is still operating long after being amortized, and it's still bringing in that high annual return in scrap.

What is your tramp iron problem? Dings can solve it profitably. *Ask for Bulletin C-5000-B.*

Dings

ELECTRIC AND NON-ELECTRIC MAGNETS FOR EVERY JOB

DINGS MAGNETIC SEPARATOR CO. • **4766 W. Electric Ave., Milwaukee 46, Wisconsin**

Magnetic Separation Leader for over Fifty Years

For more facts circle 556 on Reply Card

This conveyor belt says "STOP" to ripping

How often has your plant had to junk an almost new conveyor belt . . . ripped to shreds by razor-sharp particles which embed themselves in the belt, then jam and slit long sections?

NYB&P's new RESISTORIP* construction is designed to put a stop to such needless waste! This construction, for which a patent is pending, can be incorporated in any of the better grades of NYB&P conveyor belting.

Essentially, it consists of groups of high-tensile steel wires built transversely into the belt's carcass at close intervals throughout its length. When a sharp, partly-embedded object starts to rip this belt, it quickly encounters one of these wire groups. Immediately it is ejected . . . and damage to the belt is confined to a very short section, only inches in length! This RESISTORIP construction, however, does not adversely affect troughing characteristics.

Designed by NYB&P belting specialists to withstand even the hazards of foundry shake-out service, and field-tested for more than five years, RESISTORIP Conveyor Belting has amply demonstrated its ability to double or treble the life of belts carrying sharp-edged materials likely to cause ripping.

Only your NYB&P distributor can supply you with belting of RESISTORIP Construction. Write or phone PRescott 7-6940, Passaic, N. J., for his name and address. **Trade Mark*

Gilmer V-BELTS AND "TIMING®" BELTS

NYB&P INDUSTRIAL RUBBER PRODUCTS

NYB&P — NEW YORK BELTING & PACKING CO. (Founded 1846) — 1 Market St., Passaic, N. J.

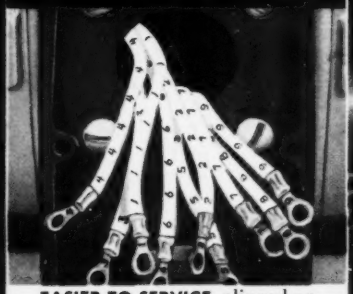
America's Oldest Manufacturer of Industrial Rubber Products

For more facts circle 557 on Reply Card

For more facts circle 558 on Reply Card ⟶

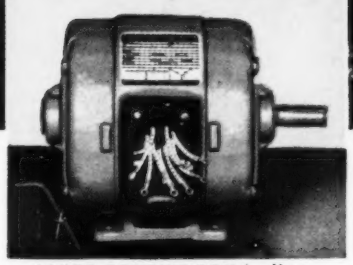
TRI 55 CLAD THE LEADER IN MODERN MOTOR DESIGN

PERMA-NUMBERED LEADS



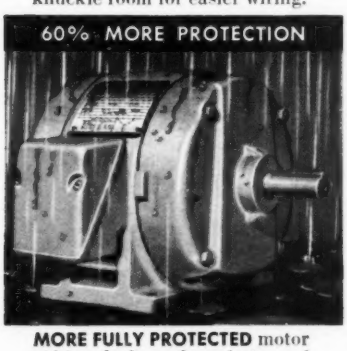
EASIER TO SERVICE, clipped or taped terminals always can be read. You save hooking-up time.

EASY ACCESS CONDUIT BOX



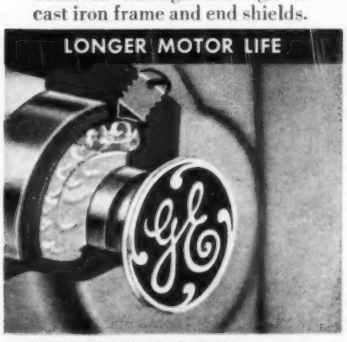
LARGE CONDUIT BOX is diagonally split—gives you ample knuckle room for easier wiring.

60% MORE PROTECTION



MORE FULLY PROTECTED motor achieved through redesign of cast iron frame and end shields.

LONGER MOTOR LIFE



NEW BEARING SYSTEM means the G-E motor runs longer without relubrication than any other.

Now, easier installation, less maintenance...

G.E.'s new TRI 55 CLAD motor— you can install it and forget it!

REG. U.S. PAT. OFF.

The all-new General Electric Tri/Clad '55' motor is specially engineered to reduce your installation costs . . . and run longer, without attention, than ordinary motors. This new motor gives you 60% more physical protection plus longer electrical life. In addition, a bearing system designed to use the most modern greases means you will not have to regrease the Tri/Clad '55' for years.

You save with the new Tri/Clad '55' because wiring is easier and faster. The large, diagonally split conduit box gives you plenty of knuckle room. Leads are perma-numbered . . . you can always identify them instantly.

The new Tri/Clad '55' also brings you important handling, storing and installing economies. Better use of space within the frame means a 30% reduction in size and weight in some ratings. Yet active materials (magnetic steel and copper) are not sacrificed.

General Electric Tri/Clad '55' motors are now available in many ratings. The complete line of 1 to 30 hp a-c motors will be available soon. For full details contact your G-E Apparatus Sales Office or G-E Motor Supplier today. Write for Tri/Clad '55' bulletins GEA-6013—Dripproof motors, GEA-6012—Enclosed motors, GEA-6027—Gear-motors. General Electric Company, Section 648-7, Schenectady 5, N. Y.

Progress is our most important product

GENERAL ELECTRIC

INCREASING USE OF ELECTRIC POWER CALLS FOR MODERN DISTRIBUTION SYSTEMS

General Electric's expanding wire and cable facilities and services can help you handle new or greater loads

The continuing development of new electrical equipment, processes, and materials handling methods doubles the use of electricity about every ten years—according to the findings of qualified authorities. In industry, this increasing use of power makes it important that you plan, install, and maintain bigger and more flexible distribution systems to handle these growing loads. To assist you, General Electric has expanded its facilities, and is prepared to help you in the application, use, and maintenance of modern distribution systems.

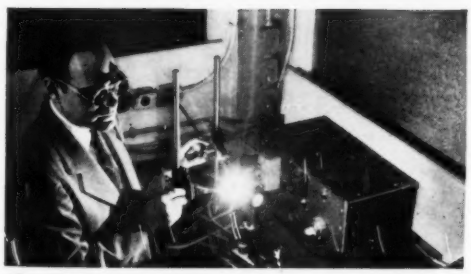
1 PLANNING AND APPLICATION.

G-E wire and cable specialists are ready to help you select and plan cable systems with the capacity and flexibility needed for growing loads.

2 WIRE AND CABLE AVAILABILITY.

General Electric is adding a new wire and cable plant to its facilities in Bridgeport, Connecticut, to continue to supply you with the products on which cable systems depend. This new plant will be able to produce more cable faster, and will supply you with new cable products to meet new needs.

If you want help NOW . . . just call your G-E wire and cable specialist, or write Section W121-464, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.



3 MAINTENANCE OF CABLE SYSTEMS.

General Electric's test facilities help minimize maintenance problems. Thorough production-line testing, coupled with research and developmental testing, give you wire and cable products with longer life and coordinated insulation levels. Also, the flexibility designed into G-E wire and cable systems make it possible for you to alter and expand these systems as loads change and grow. (This spectrographic test for copper conductor purity is one example of G.E.'s laboratory testing.)

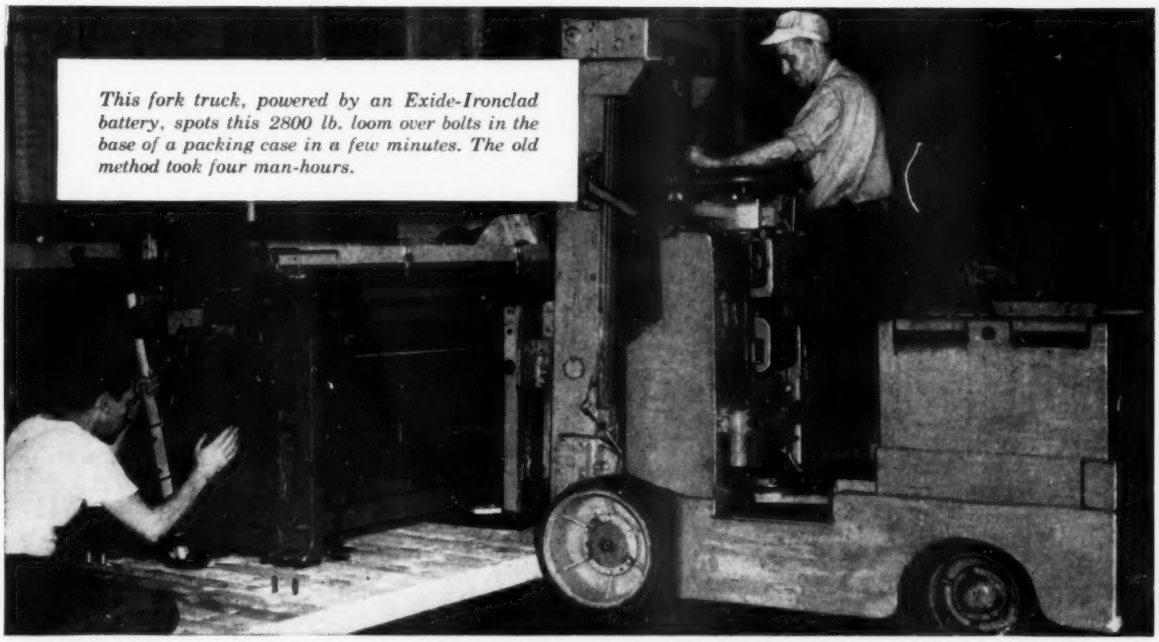
You can put your confidence in—

GENERAL ELECTRIC

For more facts circle 689 on Reply Card

GET FAST, SAFE HANDLING

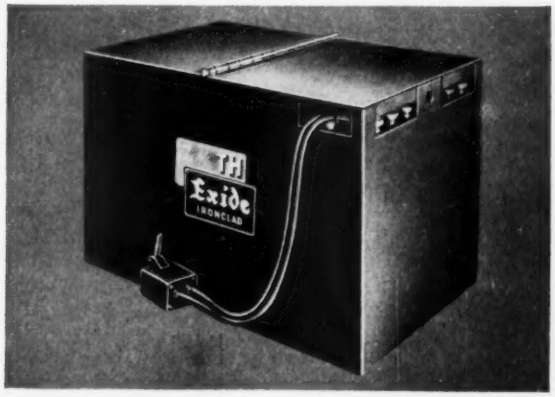
...with low cost Exide®-Ironclad® power!



This fork truck, powered by an Exide-Ironclad battery, spots this 2800 lb. loom over bolts in the base of a packing case in a few minutes. The old method took four man-hours.

YOU GET fast, safe and low cost handling when your lift trucks are powered by dependable Exide-Ironclad batteries. In addition, these rugged, long life batteries assure full-shift operations and high availability of equipment. Lower costs for operation, maintenance and depreciation make Exide-Ironclads your best power buy—AT ANY PRICE!

THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power*. Also, more active material is retained, giving *longer working life*.



THE NEW THRIFTY HAULERS! The improved industrial truck battery using *non-oxidizing* plastic power tubes for longest battery life, more capacity in the same space. For full details, call your Exide sales engineer—write for Form 1982 (Installation and Maintenance of Motive Power).

Your best power buy ...AT ANY PRICE!

Exide®
IRONCLAD BATTERIES

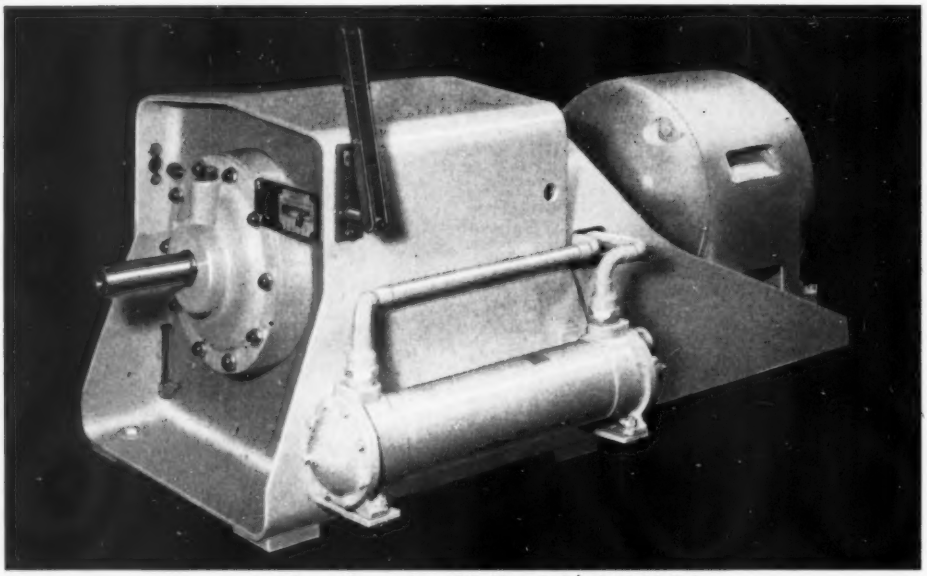
Exide INDUSTRIAL DIVISION. The Electric Storage Battery Company, Philadelphia 2, Pa. • *Exide Batteries of Canada, Limited, Toronto*

For more facts circle 559 on Reply Card

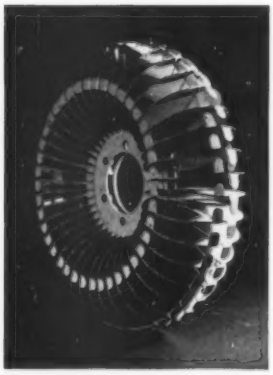
ANNOUNCING THE NEW AMERICAN BLOWER

Gýrol FLUID DRIVE

TYPE VS CLASS 2



American Blower Type VS Class 2 Gýrol Fluid Drive



A phantom view of the driving and driven members, which provide smooth, reversible power transmission.

- **Can be reversed while in motion at any variable operating speed by merely reversing direction of rotation of motor**
- **Permits adjustable speed control over a wide range**
- **Built in several standard arrangements**

HERE IT IS! A brand-new fluid drive that will help you solve many tough industrial-drive problems. It's the American Blower Type VS Class 2 Gýrol Fluid Drive. A compact, self-contained, adjustable speed unit.

The result of years of development and research, this adjustable-speed fluid coupling is crammed with features. It has unlimited application possibilities, with its wide-range, stepless speed, reversible control. Even on constant-torque loads, a 4-to-1 speed range is obtainable!

It permits driving motors to reach full-load speed before engaging the load. In many cases simple across-the-line starting may be used. Adjustable speed may be obtained by either automatic or manual adjustment of the speed-control lever.

The new Type VS Class 2 Gýrol Fluid Drive is available in six sizes . . . 7½ through 800 h.p., at normal motor speeds up to 1800 r.p.m. Built in five standard arrangements, it can be used on a wide variety of industrial applications.

For complete information about the Class 2 Gýrol Fluid Drive, give your nearest American Blower Branch Office a call, or write us for Bulletin 9419.

For smaller applications the Type TM Constant Speed Gýrol Fluid Drive is available in ratings from 1 to 20 h.p.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator & Standard Sanitary Corporation

AMERICAN BLOWER

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

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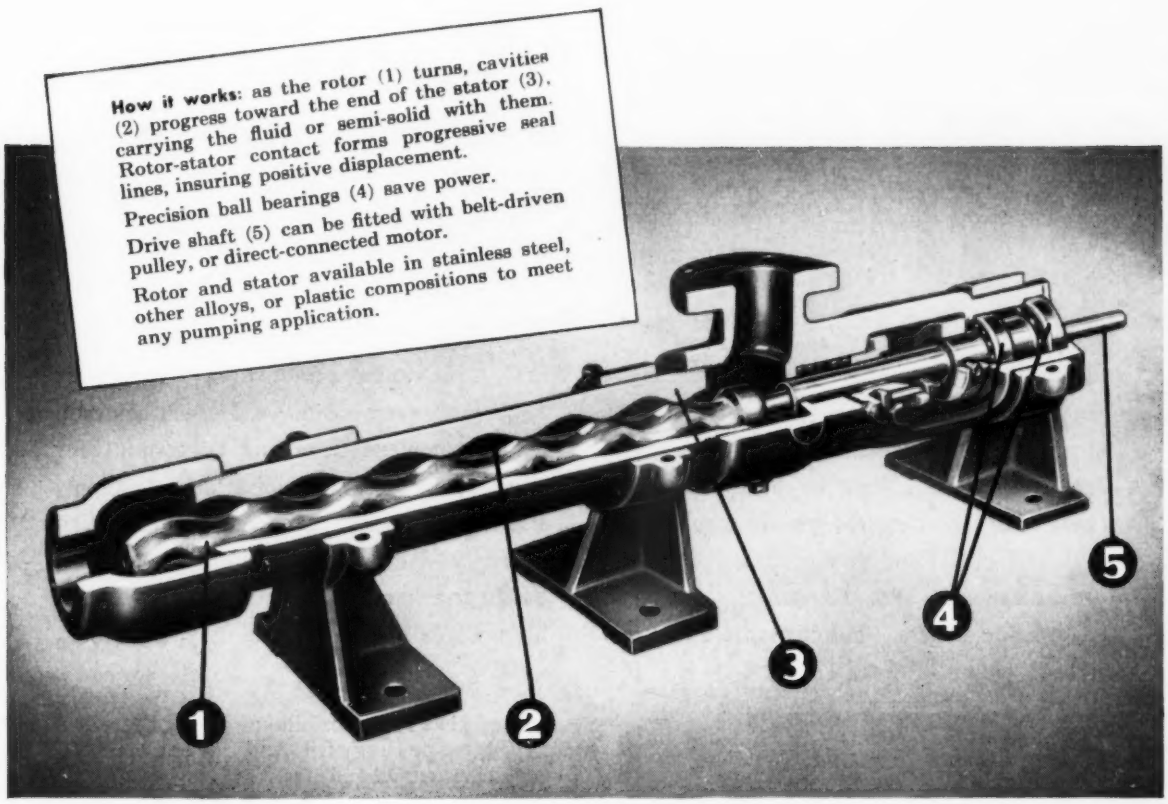
How it works: as the rotor (1) turns, cavities (2) progress toward the end of the stator (3), carrying the fluid or semi-solid with them. Rotor-stator contact forms progressive seal lines, insuring positive displacement.
Precision ball bearings (4) save power.
Drive shaft (5) can be fitted with belt-driven pulley, or direct-connected motor.
Rotor and stator available in stainless steel, other alloys, or plastic compositions to meet any pumping application.
1
2
3
4
5

If your pump requirements are a little different...

The entirely different MOYNO® Pump may be exactly what you need!

FACTS ABOUT THE MOYNO

the world's simplest pump

- **Positive Displacement**—Moynos are available to pull up to 29 inches of vacuum while discharging under pressure. Big Moynos can deliver up to 250 gallons per minute, against pressures up to 600 p.s.i.
- **Gentle**—no churning, foaming; won't break up semi-solids.
- **Reversible**—pumps with equal efficiency in either direction.
- **Trouble-Free**—self priming; won't cavitate or vapor-lock. Just one moving part—no valves to stick, no pistons to gum up. Built for tough service, easy to maintain.
- **Versatile**—handles liquids, pastes, abrasive-laden slurries, vacuum applications.

You name the problem! Are your pumped materials viscous, semi-solid, hard to move? Do they tend to disintegrate? Are they abrasive? Do pump maintenance costs seem high? If "yes" is the answer to any of these, find out why Moyno Pumps handle jobs where other pumps fail!

The Moyno is different! The cutaway view above—and the facts listed at left—describe a completely new concept of pump design. They show why the Moyno is a pump you can specify, install and *forget*.

Will it solve your problem? Chances are it will . . . at least there isn't a more versatile pump made! Moynos pump clay for a leading pottery maker. They're being used for handling white water in paper mills . . . for caustics . . . an Eastern food producer is even using them successfully for pumping potato salad!

Get more facts today! An interesting, factual bulletin will tell you more about the simple, versatile Moyno Pump. Write for your free copy of Bulletin PE-103.

ROBBINS & MYERS, INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO

Fractional & Integral h.p. Motors & Generators | Electric Fans | Electric & Hand Hoists & Cranes | Moyno Pumps | Propellair Industrial Ventilating Equipment

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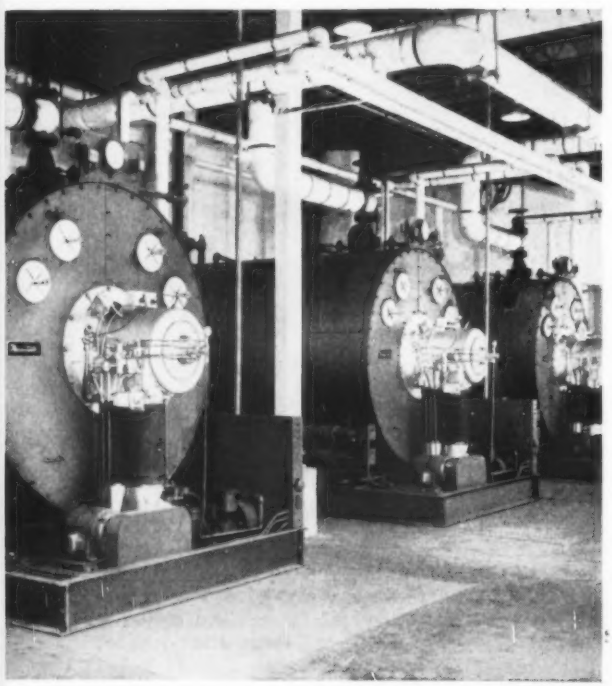
New.. Powermaster® exclusive.....

Now . . . for the *first time* you can get packaged boiler units in the wide range of capacities from 15 to 500 HP, with *complete interchangeability of fuels* . . . light or heavy fuel oil—natural or manufactured gas—or combination gas and oil . . . and you get this cost-saving advantage *only* with *Powermaster* Packaged Automatic Boilers. Find out more about this new, wide-range service today from your *Powermaster* representative. He will help you with recommendations and suggestions for selecting the most economical units to supply steam or hot water requirements in any kind of service—industrial plants, institutions, public buildings, schools, laundries, apartment houses, hospitals, dairies, motels, and shopping centers.



- Complete Fuel Flexibility:
  Light or Heavy Oil, Any Gas or Combination Oil and Gas.
- Choice of:
  Air Atomizing VORIFLOW Oil Burner —Pre-Mix VORIFLOW Gas Burner— Combination VORIFLOW Oil and Gas Burner—All Designed and Built by O & S.
- Full-Range Modulation with VORIFLOW Combustion.
- All Middle-Range and Large Capacities.
- Selection of Automatic Operating and Safety Controls.
- Instant Change from Fuel to Fuel.

Model 3 *Powermaster*—Experienced-proved to be the standard of industry. These three 350 HP units are supplying process steam at pressures up to 200 psi.

Send for bulletins describing Model 3 and Model 4 *Powermaster* units.

ORR & SEMBOWER, INC.

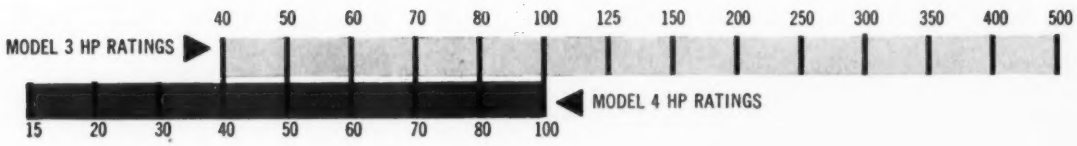
READING, PA.

BUILDING DEPENDABLE BOILERS SINCE 1885

. . a choice of 2

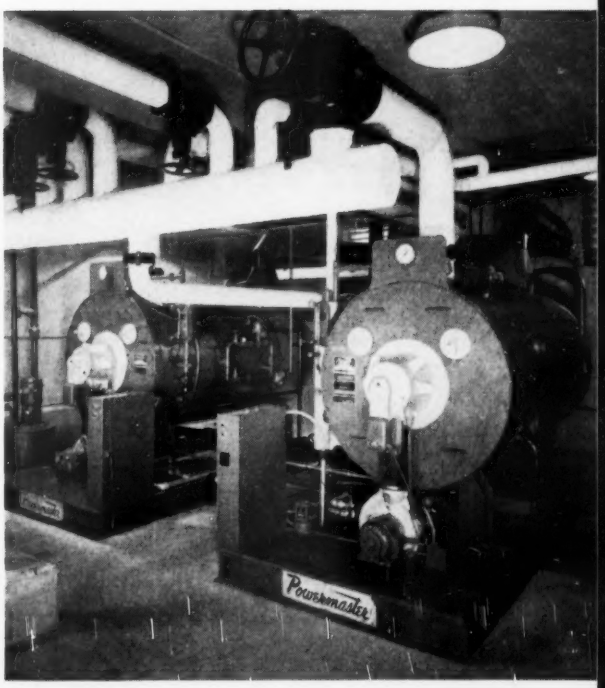
Powermaster Packaged Automatic Boilers to meet your specific operating requirements . . . to your best advantage.

for 15 to 250 psi. steam or hot water



- Choice of Fuels:
  Light Distillate—Natural Gas—Manufactured Gas—Combination Oil and Gas.
- Choice of:
  Mechanical Pressure Atomizing Oil Burner—Pre-Mix Gas Burner—Combination Oil and Gas Burner—All Designed and Built by O & S.
- On-Off and Low-Fire Start Burners.
- Small and Popular Middle-Range Capacities.
- Selection of Automatic Operating and Safety Controls.
- Quick Change from Fuel to Fuel.

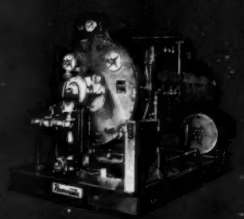
Model 4 *Powermaster*—Already service-proved in wide variety of successful applications. This installation of 40 HP units supplies 15 psi. steam for heating.



O&S

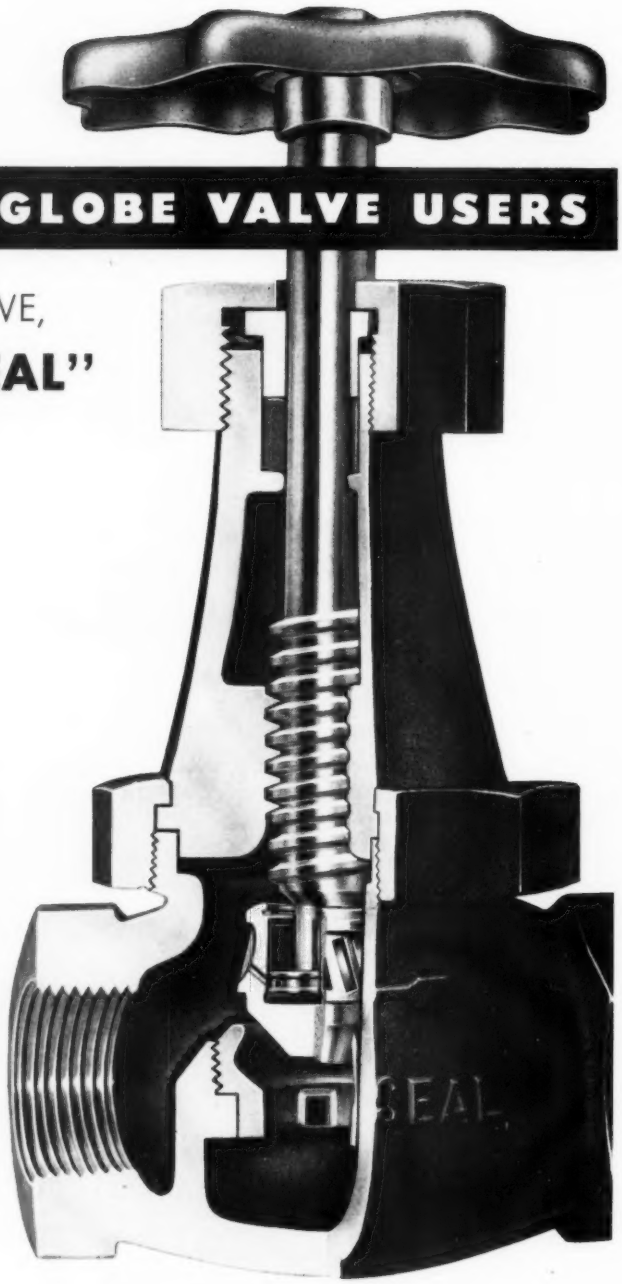
Powermaster®

PACKAGED AUTOMATIC BOILERS



GOOD NEWS FOR GLOBE VALVE USERS

THE FAMOUS OSTLIND VALVE, NOW CALLED **"GYROSEAL"** IS BACK! . . . . . .



Thousands of satisfied users report their original Ostlind Valves still on the line after years of exceptional service. Still no leaking, no freezing. Costly repairs and down-time greatly reduced.

GYROSEAL Valves retain the exclusive patented features. The disc revolves freely on long-lasting carbon bearings, keeping particles in suspension while the disc gently laps the seat for perfect closure. Upon opening, the disc again revolves casting off accumulated solids to keep the closure area clean.

The disc continues to revolve until the cracking or throttling position is reached. There, the disc stops revolving and the valve can be left in cracked or throttling position indefinitely. Note the increased area passage at the closure seat and reduced area at the throttling seat. Abrasive particles, bombarded by high pressure, cannot scour the closure area.

Materials now used in GYROSEAL Valves assure trouble-free use not only in steam lines but also where the most corrosive fluids are involved.

WRITE FOR FULLY DESCRIPTIVE BROCHURE

THE RICHMOND FOUNDRY & MANUFACTURING COMPANY, INC.

Department A, Richmond 20, Virginia

GYRO VALVE SEAL

Exclusive Producers of the **GYROSEAL** *Valve*
Production quantities available in 1" size only

For more facts circle 563 on Reply Card

Which Truck is Best for Your Needs?

GAS TRUCK	ELECTRIC TRUCK	DIESEL TRUCK	LP-GAS TRUCK	HAND LIFT TRUCK

Yale Makes Them All!

. . . and there's a Yale Truck with the capacity you need from 1000 to 100,000 lbs.

YALE has a Truck with fuel, capacity, and interchangeable attachments . . . exactly suited to your particular handling needs. And, every YALE Truck is quality built . . . designed to save time, space, manpower . . . slash handling costs as much as 75%.

OPERATOR TRAINING TO FIT *YOUR* REQUIREMENTS

can mean reduced maintenance costs, longer truck life, and substantial production economies through proper use. Ask our representative about this comprehensive YALE service . . . and ask him about the new Finance-Lease Plan for acquiring YALE equipment.

SHOWN HERE ▶

is a YALE *Fork Lift Gas Truck. It maneuvers smoothly in close quarters . . . stacks heavy loads ceiling high.*

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MAIL THIS COUPON TODAY
The YALE & TOWNE Mfg. Co., Dept. 474
Roosevelt Boulevard, Phila. 15, Pa.
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INDUSTRIAL TRUCKS AND HOISTS

*Reg. U. S. Pat. Off.

Gas, Electric, Diesel & LP-Gas Industrial Trucks • *Worksavers* • Hand Trucks • Hand & Electric Hoists • Pul-Lifts

For more facts circle 564 on Reply Card

IT FLOATS ON THE LOAD! *

You turn on the steam.

This little stainless steel valve—the only moving part in the Yarway Impulse Steam Trap installed on the equipment—opens wide and *stays* open as the air and condensate continuously pour through.

The equipment reaches production temperature in the quickest possible time.

Production temperature reached, the little valve snaps shut. After that, by a pulsating action, it discharges all condensate as it forms—even a tiny teaspoonful. *There's hot steam in the equipment all the time* . . . steady, maximum temperatures are maintained.

It all adds up—to more production per day.

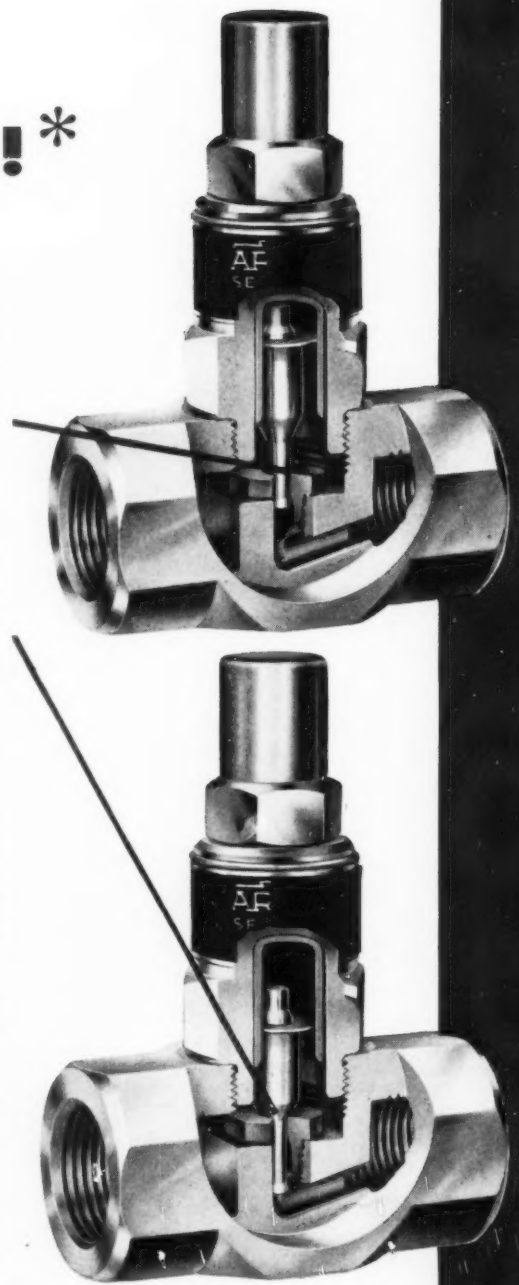
Other profit-making features of the Yarway Impulse Steam Trap—low initial cost, easy installation, stainless steel construction, low maintenance, good for all pressures, quick delivery from over 200 local industrial distributors.

Try a Yarway—free for 60 days—and *prove* its advantage. Your distributor will supply you.

For free Yarway Impulse Steam Trap Bulletin T-1740, write . . .

YARNALL-WARING COMPANY
145 Mermaid Ave., Philadelphia 18, Pa.

* . . . *resulting in fast heat-up of equipment, more production per day.*



YARWAY | impulse steam trap

For more facts circle 565 on Reply Card

COLOR CONDITIONING
Proves Itself at National Air Lines

Besides the usual surface protection, well-planned color conditioning at National Air Lines has increased visibility, promoted safety and good housekeeping . . . That's a lot of big extras for a job that had to be done anyway

By H. S. EADS, Mgr., Engine Overhaul, National Air Lines Base

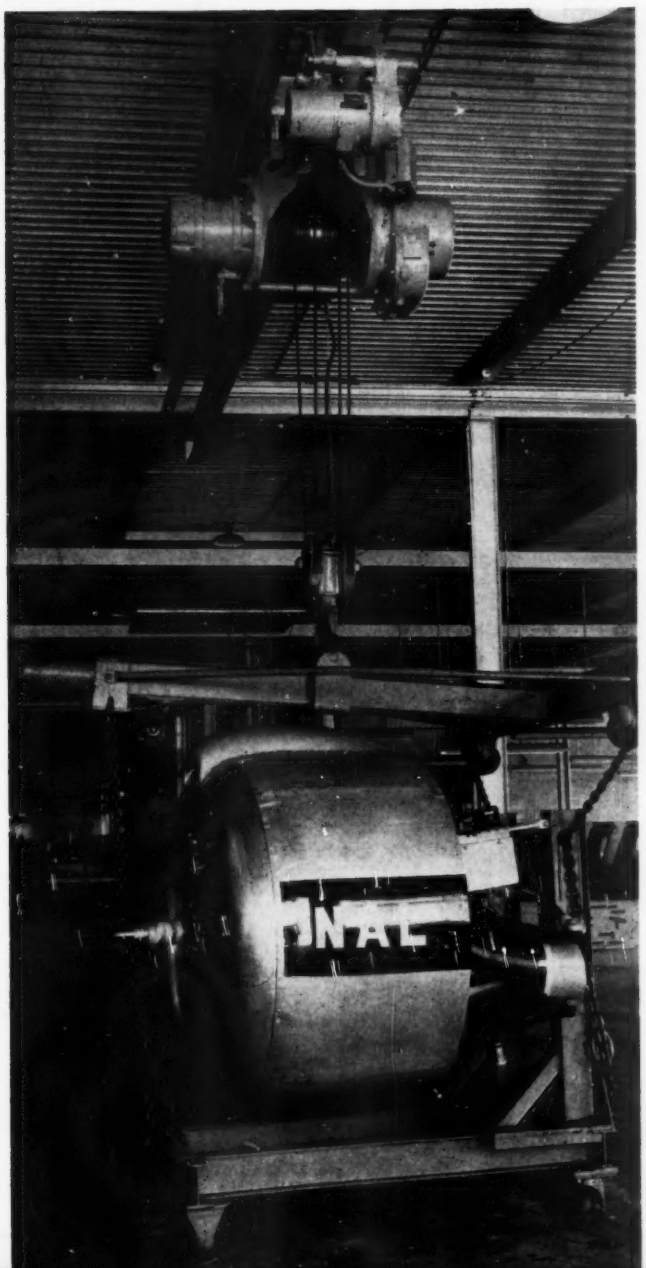


Fig. 1. Overhead crane and hook painted orange for "on guard." Moving parts, projections, the inside of switch or fuse boxes, and guards are painted orange. If you see orange—be "on guard"

NATIONAL AIR LINES indoctrination into the full use of color dynamics was gradual; the result of two years of experimental progress.

These factors delayed quick acceptance: initial cost of painting; unfamiliarity with the actual effect of color and its use; the possibility that color conditioning might require more frequent repainting and add to the maintenance cost; some skepticism as to whether the work time lost in repainting the equipment in accordance with dynamic color recommendations would be balanced by increased efficiency in subsequent performance.

A new building to be constructed at the Miami Airport to house both our Jacksonville and Miami Base facilities, made suddenly possible the full use of color dynamics. Our limited, but increasing, use of color conditioning had proved so obviously effective that only the elements of ready time and money stood in the path of complete adoption. A new building had to be painted anyway, and that largely nullified both objections.

Color Dynamics Cost No More

We had found it cost no more to paint a machine or a room in accordance with the principles of color dynamics, than it did to daub on paint for the basic purpose of surface protection. Color dynamics merely provided additional values out of the same can of paint: such as, increased safety; visibility; eye comfort, and employee morale.

At this point we asked Earl E. Thery of Pittsburgh Plate Glass Company (Miami office) to work out dynamic color recommendations for the new buildings. He had been working with us for the past two years and was familiar with our equipment, problems and progress.

His recommendations established painting standards and a color placement schedule in accordance with the theory and practice already adopted in our accessory overhaul shop in Miami,

Fig. 2. All fire extinguisher stations on columns or in wall niches are distinguished by red paint on all sides of column or as a background around the area. Column at left is painted to match wall. Base of column in background is red

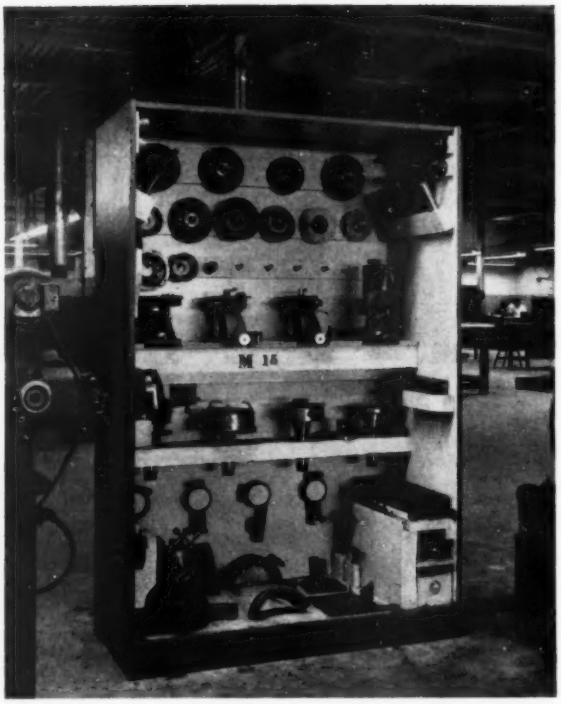


Fig. 3. Interiors of cabinets, storage space, work tops, are painted Focal Ivory to encourage good housekeeping and it makes it easy to "find" things. This is an excellent example of accessories filed at one machine station for instant use

including machinery, equipment, and physical structure.

Color specifications included Seafoam Green on the east and west walls of the new building from the 16-ft ceiling, down to the 6-ft wainscoting of Eyerest Green. Seafoam Green provides 60 per cent light reflection, and the Eye Rest Green only 30 per cent.

Fluorescent lighting provides the main source of illumination; windows in east and west walls provide some light; but the main light from the outside comes in the south windows. The south window wall is painted Eye Rest Green, rating 30 per cent light reflection; and the opposite north wall is painted Sunny Yellow (above the 6-ft Eye Rest Green wainscot) with a 72 per cent reflection rating.

The 6-ft Eye Rest Green wainscot throughout the plant, cut to 4 ft in offices and entrance hall, reduces maintenance cost, saves on number of repaintings and extent; rubs, scars and bumps are being "touched-up" by maintenance men.

Greater light reflection of the paint about the wainscot provides for more efficient use of light. The Sunny Yellow, in addition, relieves monotony, provides a morale factor, makes the whole area seem brighter—when looking toward the blank north wall.

As the huge plant area has many support columns, each side of each column is painted to match the wall being faced to avoid a sense of confusion.

Exceptions to this point are support columns on which fire extinguishing equipment is hung. Such columns are painted Fire Red on four sides and the location of fire fighting equipment can be distinguished at a glance through the plant.

There are electric outlets on all support columns.

Areas around wall niches for fire extinguishers are also painted Fire Red.

Orange Means Danger

Overhead cranes, hooks, any moving part, or danger area in the floor is painted Bright Orange, "Orange for 'on guard'." The inside of wall electric switch box doors are painted Orange—"If you see Orange, something's wrong. The door should be closed."

Office walls are Sunny Yellow above the Eye Rest Green 4-ft wainscot. They are painted to "pick up," to brighten and eliminate that "Monday morning" feeling. Ceilings are off-white for high light reflection and to prevent a cooped-up feeling.

To provide visibility, perspective, and cheer to smaller subwork areas, such as the boiler and air compressor room, sand blasting department, electric plating department, and engine parts cleaning room, the north wall is painted Sunny Yellow above the wainscot and other walls follow plant color scheme.

Locker rooms, clean, spacious and airy, were treated as places to clean-up-and-get-out-of; painted to match the blue-green tile. Fixtures and towel dispensers are white. Lockers are dark gray.

Lines of regularly spaced 3-in. yellow squares outline the traffic ways which must be kept clear. All dollies and vehicles move between the two dotted lines marking the edge of the passageway. This marking was a temporary expedient for "opening day," but it may prove sufficiently satisfactory to supplant the usual painting of the route in white with a yellow border.

Recommendations called for ceilings to be painted Cascade Blue mixed with white for a 73 per cent light reflection rating. As the ceiling is dull aluminum causing no particular contrast with the pipes and lines overhead, and as it is well above the fluorescent light fixtures, it was decided to save at this time, the $5000 it would cost to paint the ceiling.

Pipes have not yet been painted to match the color of the ceiling, preventting the weblike appearance that often causes a sense of confusion.

Pipe identification, the painting of valves, flanges, couplings and bands where pipes leave or enter wall or ceiling, is being progressively accomplished at this time: (All of the equipment, machines and personnel from Jacksonville, Florida, has been moved in and settled since the construction was completed a few months ago; and the installation of some of the Miami department is still going on.)

Pipe line identification will follow the conventional color code of:

Red for sprinkler systems; Yellow and Orange for gases, acids and steam (212—800 F.); Green, Light Grey, Dark Grey, White or Black for safe materials, drinking water, compressed air;

Blue, protective materials, antidotes; Purple for extra valuable materials.

Basic color for machines has been standardized at Dark Green, known as Vista Green, enamel. But that is the story of Ed Driscoll, Accessory Overhaul Shop Foreman, who first led the way in experimenting with Dynamic Color.

Color Code Used at National Air Lines

ORANGE	"On guard," highest attraction value; for dangerous parts and areas, machine guards, moving parts, master or emergency controls, inside of switch box doors.
YELLOW	Indicates danger, moving vehicles, outline of traffic ways; yellow with black hash marks for standing obstacles, stairways, or around open pits or holes.
RED	A color connected with fire; for fire fighting equipment; to mark location of extinguishers on columns, wall nooks, or corner areas.
BLUE	A caution color; tags and flags for machines in repair, circuits out of order, something being worked on.
GREEN	First Aid. Indicates medical center, entrance to first aid room; head of showers; safety.
WHITE	Solid white for storage areas; routes; guiding white arrows, areas around trash baskets.

Experiment — Experience

Ed Driscoll first had one machine fully painted. The overall dark color, Vista Green, a receding color, was applied to all non-critical parts. Then Focal Ivory, a light color that would not only contrast with the Vista Green machine, but which would contrast with the metal materials to be worked, —was applied to work backgrounds and work surfaces; all operating parts, control wheels, levers.

Emergency switches, guards, cutting edges, moving parts that extended out into aisles were painted Bright Orange—which has more attention value than any other color. Switches, where there was less danger were painted Yellow. (In some cases a main switch or control should be painted Red for danger.)

Driscoll worked this machine, and rotated some of his men on it.

"It was so obviously easier to do business with this machine," Ed Driscoll said, "that the difference, as a sailor might say, was just as bright as paint."

There was a marked increased ten-

Fig. 4. This hand press, operated by Raymond Dixon, displays Focal Ivory levers and control wheels as well as a Focal Ivory critical work area and background. The long arm is painted orange, because it protrudes into the aisle

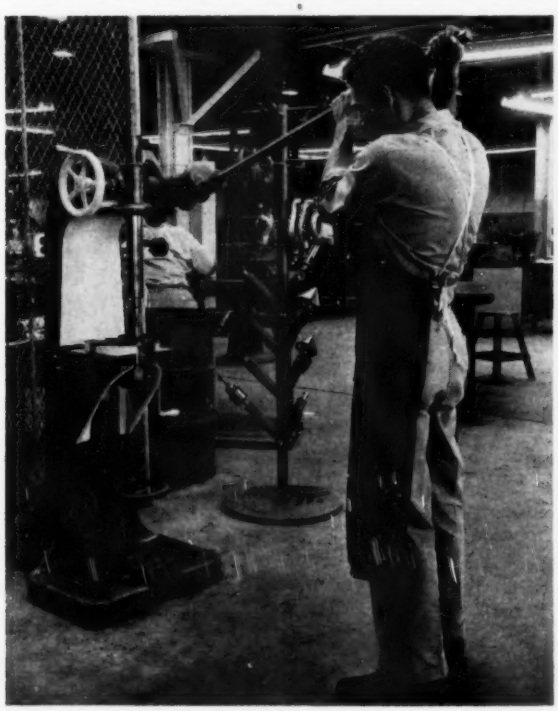


Fig. 5. Focal Ivory colored control levers and wheels on this radial drill press operated by Don Bucan, provide an excellent example of how these painted parts stand out against the over-all Vista Green color of the machine tool itself

Fig. 6. Dotted lines of 3 in. yellow discs, a quick concession to "opening day," outlines the traffic ways that must be kept clear for vehicles

dency to keep the machine clean. A blob of oil or grease stands out on Focal Ivory where it doesn't on grey, black or dark green. The urge to keep the machine clean also promotes and increases the safety factor.

"It was found," Driscoll commented, "that it was easier to read instruments, micrometers; the Ivory background seemed to gather light without glare." The controls stood out; were easier to reach without concentrating to see. The enhanced visual acuity made it easier to keep hands out of the wrong places.

From that start all machines and equipment in the plant were given the dynamic color treatment, piece by piece, until the shop was 100 per cent painted.

Best that could be done for the old structure was to paint the walls a two-tone green, with an ivory ceiling, for there was both a light problem, and a window glare problem. But Focal Ivory backgrounds were painted on workbenches (natural wood, varnished, was maintained on bench work tops). Cabinet and storage interiors were painted Focal Ivory, pipes or obstructions that extended into the aisles were painted Orange; even the tops of seats and stools were painted the Ivory,—"Keeps a guy from missing his seat," Driscoll observed.

Result of this clean-up, paint-up campaign became apparent in four ways that reflected savings in shop operation and maintenance:—

1. Since the program started two years ago, there has been only one accident that could be termed serious;

2. It has reduced housekeeping around the area of the machines. It was necessary in the past to point out sloppiness, now it is not uncommon to have a man say, "My bench is beat and I'd like to paint it." Each man takes responsibility for his own machine and station;

3. It actually doesn't cost as much to keep machines painted right, because instead of letting grime accumulate, the operator keeps it polished. Parts last longer.

4. Maintenance cost is reduced as an operator won't allow a machine to get down so far.

Transferring A Plant

When we knew the Jacksonville Engine and Accessory Overhaul Department under Director D. A. Shropshire was definitely moving down to Miami, the dynamic color painting of that equipment which had been progressing, was stopped until the move was completed. Since arriving in the new Miami color-conditioned plant, this painting is being completed.

"What we have left cannot be compared with this. No one wants to go back. Ask anyone in the plant," he suggested. "As for me, I'm more than partial to it right here. When we get under way, this plant should be a real model. Up to now we've been moving in and operating together.

"We know this though, laboratory tests have proved that there is energy in color. Color is only a mental sensation caused by the reflection of selected wave lengths of light—registered by the eye as color. Since color is a mental sensation—it must affect people, their reactions and behavior. I've noticed," he summed up, "since we've been here that this is certainly a happy friendly plant."

Perhaps nowhere is the proof of color conditioning so apparent as in the training of new men, in the quickness or slowness of their response. One of the reports that crystallized our growing interest in color conditioning was the following from Robert B. Phillips, Director of Training for National Air Lines. He pointed out:

"A painted machine is a cleaner machine; a cleaner machine makes a cleaner mechanic, and that results in cleaner work.

"In training—a painted machine is more interesting. An attractive machine makes an attractive job.

"Color in the plant makes a warmer, friendlier atmosphere: good relations result in good work."

It may sound academic, but hold out your arm and tense the muscles of the forearm and fingers. Feel the strain? When the color of material in work is too similar to the color of the machine, the same type of extra effort required to differentiate between the two is a source of eye strain. When looking up from a dark object into a glare of light—or vice versa—there is more strain contributed. Color conditioning eliminates this needless hazard and pays off in increased efficiency; more effective use of lighting; better safety values and, it costs no more.

Fig. 7. This hydraulic floor pit for working the big engines without having to climb ladders or scaffolds—is circled with orange. It is a danger area if you don't see it—so the most attention-getting color known, orange, is used to point it out

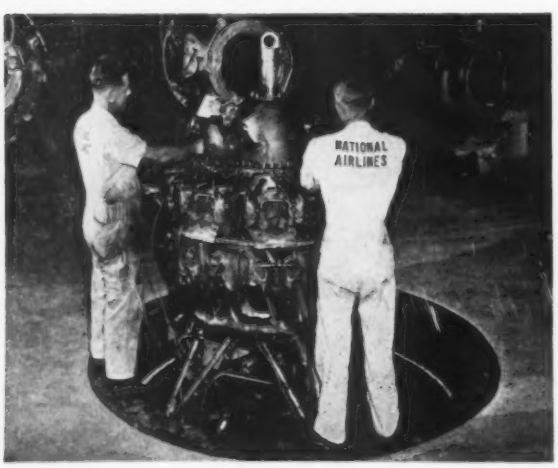
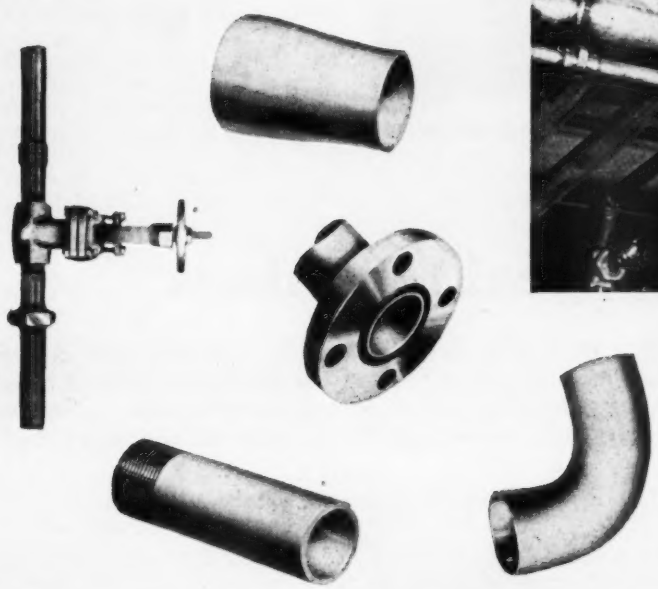


Fig. 8. Men's locker room is color treated to get employees in and out again. It is painted to match the blue-green tile. Towel fixtures are white, lockers are dark grey. It is bright but has no warmth of color to encourage loitering

Cutting Costs On STAINLESS PIPING



Pipeline installation at plant which polymerizes a resin. Installation consists of Type 316, 2 in. Schedule 5 piping with Speedline fittings and is used to carry resin at temperature of 200 psig

FOR PRESSURES up to 150 psi—and higher for sizes under 1½ in.—thin wall stainless steel piping has been proving a money-saver for many process plants. Thin wall, or Schedule 5, stainless can also be used in connection with special Speedline fittings which not only cut down the higher cost of heavier walled piping but also speed up installation.

One excellent example of such savings are reported from a farm products plant in New Jersey. Here, in addition to crated apples the firm produces large amounts of apple cider. When the cider mill is in operation about 3000 gal of cider are made per day. Formerly, another type of metal pipe was used but, in 1951, a changeover was made to stainless Schedule 5; all pipe, joints, bins, filters also are made of stainless.

In the production of these fruit juices it is not necessary to dismantle the pipe for cleaning as it is in creameries. Sweat-on joints have been used in place of unions.

Among some of the advantages listed by this user for the thin wall pipe and the special fittings are: 1. They permit greater flow of product; inside diameter of Schedule 5 reduces flow only 3 per cent, it is pointed out. 2. Cost of system was reduced considerably. Some of the fittings used cost only 1/10th as much as their counterpart in heavier sizes. 3. Multiple choice of making butt-welded, expanded, flanged, or socket type joints speed up installation.

Fittings available for this type of installation include, insert flanges, aligning connectors, unions, vanstone unions, 45 and 90 deg ells, return bends, tees and reducing tees, crosses.

Another installation, made at a plant specializing in the polymerization of resins, has resulted in an approximate installation saving of 50 per cent over the cost of installing heavier piping.

One suggestion made by the project engineer at this plant was that it was possible to weld the insert fitting to the pipe, and not to the flange; by doing it in this manner the flange is still free and may be rotated for easy aligning. In this particular installation they do not use an aligning connector; the pipe is welded end-to-end thereby necessitating but one welding operation.

For More Information

Readers interested in more information may obtain it by writing "Speedline" on the postage-paid card in this issue and dropping it in the mail box.

Technician prepares to check on vibration and unbalance with portable balancer

Investigation and Elimination of Vibration in Electrical Machines

This first part of a two-part article discusses the causes of vibrations in electrical machines and tells how to go about investigating and isolating these causes . . . Second part of article scheduled to appear in the next issue

By V. G. SOROKIN, Transportation and Generator Division, Westinghouse Electric Corp.

ROTATING MACHINES frequently develop vibrations during their operation, but these vibrations are not considered objectionable unless they disturb people, affect operation of other machines, or cause excessive wear or damage to the apparatus in which they originate. In these cases, the vibrations should be investigated and eliminated.

Causes of vibrations are mostly mechanical in nature, and can be arranged in four groups: (1) vibrations due to faults in assembly and installation and due to defects of parts; (2) vibrations due to uneven heating; (3) vibrations due to unbalance; (4) vibrations due to resonance.

In investigating these vibrations, a program of checks should be followed to eliminate the various possible causes methodically:

Check all bolts and screws used on the machine, as well as its mounting, for tightness. Use a wrench or screw driver, not the fingers only, for a bolt that feels tight to the bare hand may have enough looseness to permit vibration. Bolts to be checked first are: coupling bolts, holding down or foundation bolts, pole bolts, and bolts on rotating parts. If a finger is held at a bolted joint at the parting line, movement often can be felt and should be investigated. If bolts come loose repeatedly, the reason should be investigated.

Shaft Couplings

Shaft couplings or pulleys should be checked for looseness on the shaft. Couplings and pulleys are put on the shaft extensions of large machines with a press fit. On small size machines, a bumping fit and a set screw is frequently used. Check tightness of set screws.

The coupling or pulley fit should be checked for looseness. This can be done sometimes by removing the coupling or pulley only and by inspection of the fit. If looseness is or has been present, corrosion (rust) will be seen.

A bent shaft may be the source of vibration, so the rotor should be checked in the lathe. Shafts bent more than 0.001 in. total indicator reading should be straightened. Bending usually is present at some definite spot on the shaft because the shaft does not bend evenly along the length. Small shafts can be straightened in the lathe: place a jack from below against the bend in the shaft, apply pressure and, after each application, check the shaft for trueness by dial indicator.

It may happen that, after straightening, some local uneveness still is present. In some cases, this may be removed by regrinding the shaft. At the bearing journals, out of roundness should not exceed 0.0005 in.

Larger shafts must be straightened by the application of heat. The convex or high side is heated and the thermal expansion of the metal sets a permanent deformation in the shaft that tends to straighten it. This operation

requires considerable skill if it is to be done properly.

Alignment of couplings must be checked, for the shafts may be parallel but not in the same line. Couplings without a centering fit, and flexible couplings, should be checked by using a straight edge as shown in Figs. 1 and 2. Flexible couplings must be aligned just as carefully as solid ones. Dimension h should be less than 0.001 in.

Causes of Vibration

Another check should be taken to make sure the shafts are parallel (Figs. 3 and 4): after coupling is aligned, turn the shafts 180 deg and check alignment once more, Again, dimension h should be less than 0.001 in. (Tolerances given are average figures. For each particular case, the specifications and maintenance manuals should be checked.)

Flat spots in bearing journals, and worn out bearings, may be a cause of vibration. Flat spots may originate in the grinding operation or in handling of the shaft.

To check for flat spots, the pedestal cap and top of the bearing are removed, and several dial indicators are set along the journal. The shaft is rotated at approximately 10 rpm and readings are taken. If bearing is worn so that clearance between the shaft and the bearing's bore exceed maximum permissible clearance (approximately 1/32 in. for sleeve bearings) the bearing must be rebabbitted.

In some cases, vibration may come from some outside source such as vibration of foundation or insufficiently rigid foundation. In the case of vibration transmitted from outside, a change in mounting may help. Machines can be moved to another place or resilient suspension may be introduced.

Unevenness in a belt may be a cause of vibration. Frequency of vibration due to belt splicing may be found by measuring the pulley diameters and distance between shaft centers. Knowing rotational speed of motor, the frequency is:

$$f = \frac{6.28}{L} r_1 N$$

Where: r_1 = motor pulley radius; L = length of belt; N = motor rotational speed rpm. Check the motor by running it for awhile without the belt. Binding bolts in the solid coupling will tend to bend the shaft and be a source of vibrations. Tight and twisted bearings will cause bending of the shaft. Tight bearings will generate hot spots on the shaft and bending will develop. Cases of axial vibration of pedestals have been reported where no lateral motion of the shaft was observed. Vibration was caused by a spiral marking on the journals which was introduced during the polishing operations in the grinding machine.

In electrical machines, vibrations may be encountered due to electromagnetic forces. Loose poles, shortened field coils, loose or shortened rotor windings may cause vibration by upsetting the balance of electro-magnetic forces in rotating parts. The frequency due to shortened coil is equal to rotational speed times the number of poles in the machine.

A raised commutator bar, when hitting brushes, causes vibration of frequency equal to number of brush-holder brackets times the rotational speed.

When checking vibrations of any piece of apparatus it is helpful to write a check chart. The chart should be made to suit the apparatus to be checked. For coupled motor-generator sets, the following chart is suggested:

1. Bolt tightness checking: frame foot bolts; pole bolts; pedestal bolts; split bolts; coil support bolts.
2. Alignment: couplings; bearings.
3. Bearings: check for twisted bearing; clearance to journals:
4. Shaft: check if shaft is straight; check bearing journals for trueness.
5. Rotor: check for loose parts; coils; bandings; bolted-on parts.

There is not much trouble due to uneven heat distribution in ordinary motors and generators. Problems of vibrations due to uneven heating are encountered, however, in long flexible rotors of turbo-generators.

These latter rotors run at high speeds, 1800 or 3600 rpm. If one side of the rotor is heated, it will expand and be distorted out of its true shape. This bending of the rotor will disappear when the heating of all sides becomes equal. Bending produced by heat rotates with the shaft and acts the same way as unbalance in producing vibrations.

A few examples of how uneven heating can originate are given in the following lettered paragraphs:

A. Non-uniform flow of air through ventilating openings. The side that gets less air will be hotter.

B. A rotor which has been brought down to rest after running at operating temperature will not cool evenly around periphery. Bottom part will cool faster than upper part. The rotor will acquire a bow beyond the static deflection, when heated side during subsequent rotation is brought down. If this additional bending is not straightened out by slow rolling before bringing up to speed, a very severe vibration can be encountered.

Local Hot Spots

C. Uneven heating of shaft can be caused by "rubs" at the seals. The axis of the shaft rotating at high speed moves in an elliptical orbit. If there is insufficient clearance from the rotating shaft to the seal, the shaft will strike the seal over a small part of its periphery. The rub produces a local hot spot. Heated part expands and bends the shaft out of its true shape and creates effect of unbalance. In some

(Continued on page 180)

Figs. 1, 2, 3 & 4. Figs. 1 and 2 show how coupling is checked for correct alignment. Figs. 3 and 4 show how coupling is checked for parallelism of shaft

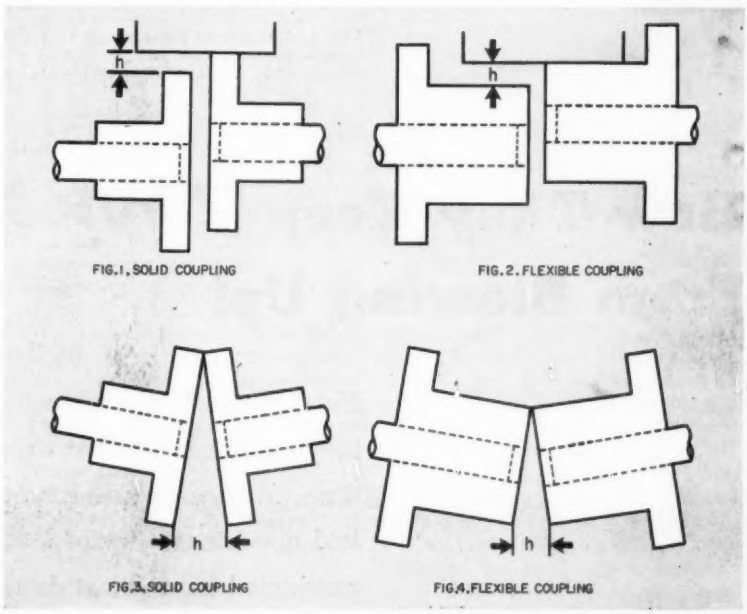


FIG. 1, SOLID COUPLING

FIG. 2. FLEXIBLE COUPLING

FIG. 3. SOLID COUPLING

FIG. 4. FLEXIBLE COUPLING

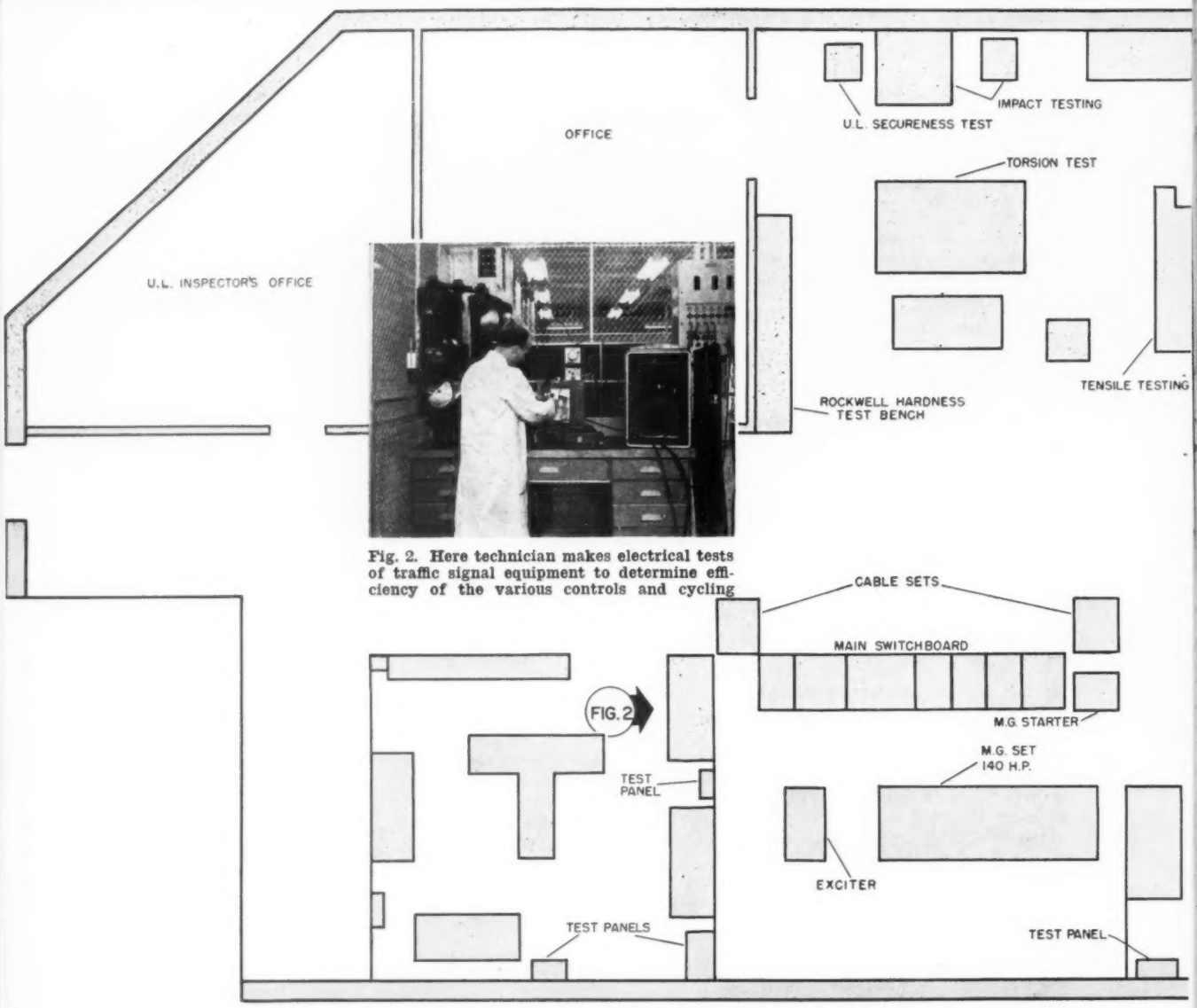


Fig. 2. Here technician makes electrical tests of traffic signal equipment to determine efficiency of the various controls and cycling

Fig. 1. The layout drawing on this and the facing page, in color, illustrates the completeness of the new electrical testing facilities in the new Crouse-Hinds laboratory. Inset photographs are taken approximately in positions shown

How They Keep YOUR PLANT From Blowing Up!

Here, in one of the newest electrical testing laboratories, they make certain that explosion-proof equipment is just that . . . How Crouse-Hinds has planned, equipped, and laid out this test facility . . . What are some of the tests conducted here; what do they mean to plant engineers?

Fig. 3. General view of the testing laboratory showing, in the foreground, tensile test machine, and in background, main switchboard

Fig. 4. Section of lab with explosion test equipment. Technician is adjusting gas connection for explosion test on one product

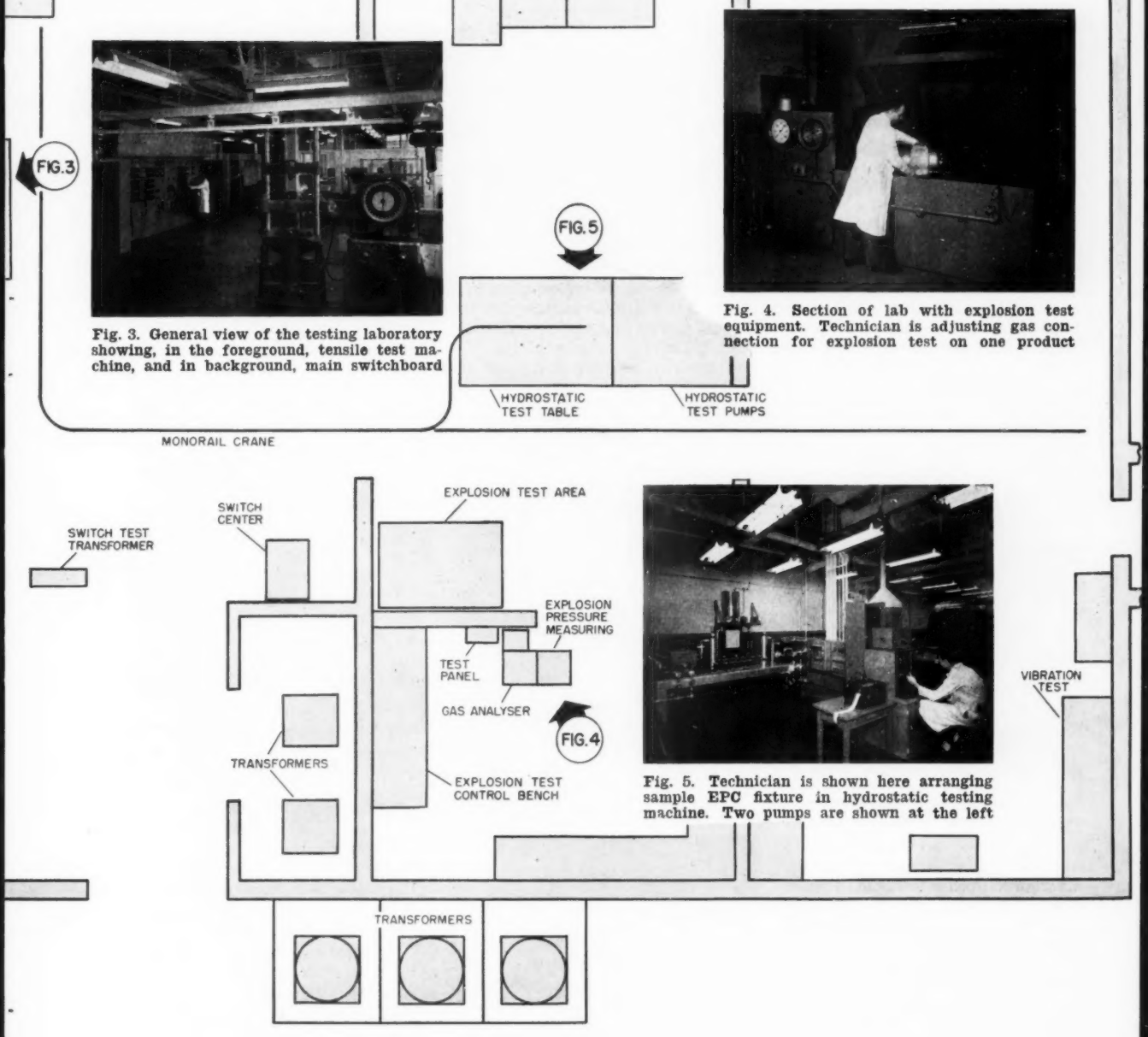


Fig. 5. Technician is shown here arranging sample EPC fixture in hydrostatic testing machine. Two pumps are shown at the left

ATOMIC TESTING grounds aren't the only places where powerful explosions occur. Every year thousands of blasts take place in plants and shops all over the country. The reason is simple: industry today requires hundreds of types of potentially explosive gases and volatile liquids to operate its equipment and to treat or finish its products. Moreover, modern industrial techniques frequently create murderous by-products in the form of 150 different kinds of combustible dust.

Take, for example, the midwestern flour mill that had been refining grain into flour for more than two score years. Dust was everywhere, blanketing windows, walls, floors, and rafters. It was caked on lighting fixtures, acting as insulation by keeping inside heat from escaping. Eventually the outside temperature of a fixture passed 165 degrees C causing the dust blanket to char and then to burn. Unfortunately, the dust-air concentrate was just right, and an explosion seared through the mill with the speed of lightning, burning everything before it.

Several organizations—manufacturers of explosion-proof and dust-tight electrical equipment, insurance companies, municipal and other government agencies—safeguard against the occurrence of such explosions by producing and inspecting adequate protective devices.

Standards for approving such protective devices are determined by Underwriters' Laboratories to meet Classes I and II hazardous locations as defined by the National Electrical Code. Class I deals with locations in which explosions or fires may occur because of the presence of explosive or inflammable gases or vapors in the air; Class II deals with locations made hazardous by the presence in the atmosphere of combustible and conductive dusts.

Thus, the National Electrical Code describes the requirements and UL specifies the standards for the use of

electrical devices at hazardous locations. It remains, then, for the manufacturer to meet them—to undertake the final responsibility for producing a safe, durable product.

Assists Efficient Production

The new Electrical-Mechanical Testing Laboratory at Crouse-Hinds Co., Syracuse, N. Y., does exactly that. Besides testing explosion-proof or dust-tight equipment to meet or surpass UL requirements, the Laboratory also checks design modifications to adapt present equipment to changing needs in the field. In addition, testing at the factory keeps production uninterrupted, leads to more efficient methods of production and, by assisting a new product to change over from a successful high installation and maintenance costs. The answer: allow electrical arcs to explode any vapors inside the fixture, but at the same time, prevent flames from escaping through any of the fixture's joints to ignite the flammable atmosphere surrounding it.

The new test center is part of a general building program that has been underway since the end of World War II. Ten thousand square feet in size, the new laboratory augments the company's general design and production research programs. Specifically, the laboratory provides electrical and mechanical test facilities to check the explosion-proof or dust-tight and many other qualities of lighting fixtures, circuit breakers, switches and other devices used at hazardous locations to

Fig. 6. Taking temperatures on explosion-proof fixtures in high ambient temperature chamber to see if it operates at safe temperature for Class I location

experimental phase to regular production channels, gets quicker results.

For example, while running an experimental temperature test on a new explosion-proof lighting fixture, a technician noticed the fixture's aluminum reflector was slightly discolored. Further tests at 200 C caused the fixture reflector to turn a deep shade of brown. The reflector had been improperly sealed and at the same time, plastic components next to the reflector gave off a distillation vapor. By checking back, it was discovered that the acidity of a bath in which the reflectors were submerged had to be controlled carefully. Once this control was maintained the reflectors withstood temperature tests perfectly.

Primary function of Crouse-Hinds' laboratory though is testing—especially electrical equipment for hazardous locations. Take the problem of fluorescent lighting at a carburetor repair shop. Gasoline vapors can't be kept out of switches, conduits, or retaining fixtures without running up extremely house, energize, or control electrical circuits safely.

Electrical tests largely consist of checking insulation, endurance, electrical power and power factor measurements, temperatures of conductors and contacts, as well as overload and short-circuit characteristics of various types of electrical assemblies or products.

Mechanical Tests

Mechanical testing comprises the following: flammability and explosive limits tests; dust, gas or vapor concentrations studies; hydrostatic pressure tests to 3,000 psi; water flow measurements and nozzle calibrations; tensile, bending and compression tests to 60,000 lb; corrosion checks; and thermocouple calibrations. Vibration, fatigue, endurance, and sound tests also are an important part of mechanical test operations.

The laboratory has seven general work areas, all of which are located on the same floor. These areas are: temperature, cold and vibration test area, storage area, explosion-proof equipment test area, hydrostatic test area, general mechanical test area, light electrical test area and the main switchboard area. Physical relationship of these departments may be noted on the accompanying floor plan.

Each of these areas is equipped with test instruments and gages. Many of these devices have been engineered by Crouse-Hinds to meet the company's particular needs for adequate product inspection. The test tank for hydrostatic pressure measurements, for example, was designed and installed by the laboratory staff.

Another example is the laboratory temperature test room. Built by Crouse-Hinds, it controls room temperatures up to 125 C for operational temperature tests.

Adjacent to the laboratory building is a complete substation with an input voltage of 440 volts run in directly from the utility. Thus, the laboratory has a constant, independent voltage source of 220 volts. This voltage, in turn, is branched out to three main circuits—to test transformers, general purposes circuits and the main switchboard.

Equipment Versatile

The test transformers, located in a vault in the switchboard area, furnish electrical supply and loads for 60-cycle testing up to 1500 volts, 450 amp, in single, two-phase or three-phase outputs. When paralleled, the transformer secondary coil outputs can supply several thousand amperes at the lower voltage ratings. Together with other equipment, these transformers allow 36 different electrical tests to be managed at the same time.

The main switchboard accommodates any testing requiring up to 1500 volts. Its main function is patching circuits to eight different test stations. Also, for test purposes at the test stations, it furnishes loading that simulates actual circuit conditions.

These test stations allow personnel to set up electrical tests conveniently. Each station has a wide work table, four series of output receptacles, an amperage source of 50 amp, and load control equipment.

In addition to multiple carburetion equipment to produce explosive mixtures, the laboratory also has the following special items: a vibration machine, variable from 10 to 60 cycles per second with 0 to 0.20 in. displacement and with 10-lb table load at 25 cycles per second; a Baldwin Southwark 60,000 lb capacity tension and compression machine; and direct current generators with a combined capacity of 300 amp at 230 volts.

Production Problems and Solutions in TUBE STRAIGHTENING

Types of straighteners . . . Methods of operation . . . Problems with entry tables . . . Details of construction of entry tables . . . Typical installations, what the problems were, and how they are being solved

By **WILLIAM HYAMS**, Mackintosh-Hemphill Company, Pittsburgh

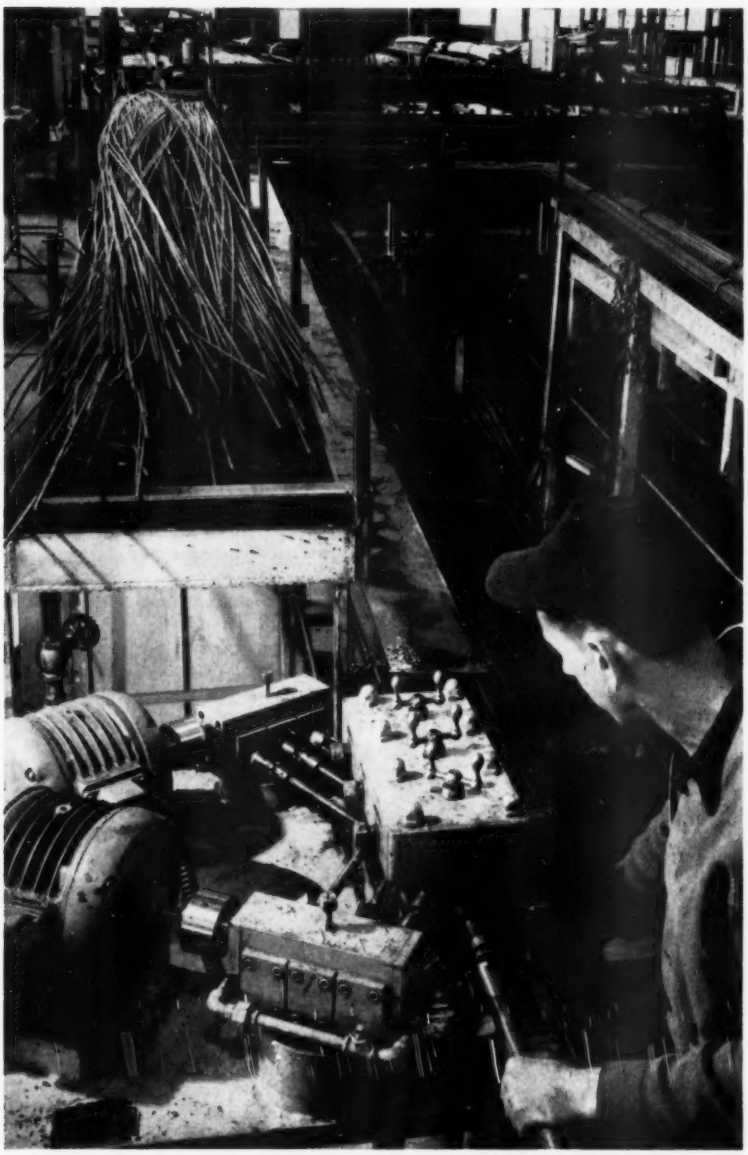


Fig. 1. Installation in Carnegie plant of Summerill Tubing Co. shows, in upper left, steel tubing awaiting straightening; at the right is rack of straightened tubing. Straightener was installed for tubing ranging in od from 0.156 to 0.437 in.

STRAIGHTENING of metal tubing has become a vital production operation, because tube lengths that are distorted by bends, hooks and bows present a variety of handling and fabrication problems.

Such tubing is difficult to thread on automatic thread-cutting machines; it cannot be accurately cut to length, and it will neither hopper-feed into, nor form properly in, automatic bending equipment. Importance of straightness in tube fabrication is such that most companies buying tubing specify that it be delivered to them straight—within narrow tolerance limits.

Only recently have production men attacked problems of tube straightening with the same attention they previously gave to studies of welding, annealing and fabrication of tube into a growing number of useful items.

Two basic ways of straightening tubing are in general use—the "two-plane" corrective bending method and the rotary method. Two-plane roller straighteners are popular for work where demands for straightness and roundness allow a certain amount of latitude in the finished product. They are fast, easy to feed, and will, if desired, straighten tubing directly from rough coils.

Two-plane roller straighteners, however, are limited in the amount of straightening which they can perform on bent tubing. Where almost perfect straightness is called for, rotary straightening machines must be used. The difference between the two straightening methods lies in the fact that while—as its name implies—the first machine imparts corrective bending to the tube on its horizontal and vertical axes, a rotary straightener travels the tube continuously through a corrective bend or series of bends which are affective in every axis of the tubing.

The rotary machine, therefore, produces a degree of straightness which

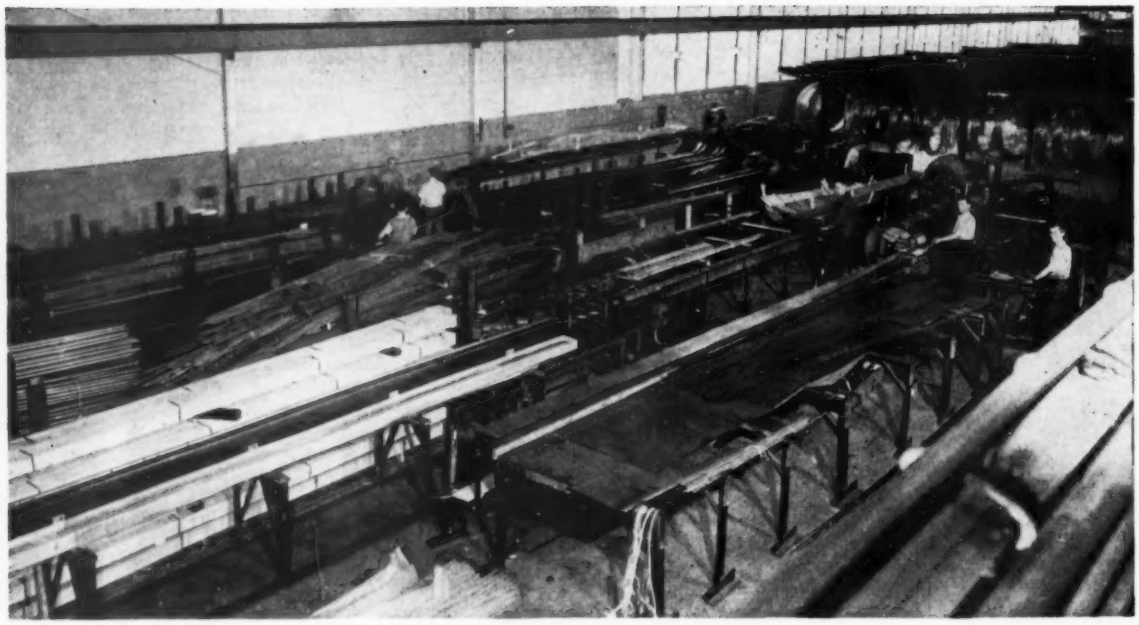


Fig. 2. Portion of plant of Viking Copper Tube Co. This plant supplies tubing for automotive, refrigeration industries

is theoretically perfect. A secondary effect of the rotary straightening process is that of "rounding" the tube. Perfect roundness is achieved because tube can be ovaled by controlled roll pressure to an extent where unbalanced stresses originally causing out-of-roundness are overcome, leaving the residual stresses in the wall metal in balance.

These valuable attributes of the rotary straightener have caused its universal adoption by tube mill personnel who have been subjected within the last few years to the problems of filling orders from tube buyers increasingly insistent on close straightness and roundness specifications.

A six-roll rotary straightener, made by Mackintosh-Hemphill, provides all the desirable results of the rotary straightening principle plus a high speed closely approaching that of the two-plane straightener. This speed is possible for two reasons: (a) elimination of tube guides removes speed-reducing tube friction and drag against guides—at the same time it precludes guide spiral marking of the tube; and (b) spindle driving all six rolls, three of which contact tube on the bottom and three on top, imparts maximum rotational torque and forward speed to the tube.

Lengths of tube travel through the machine's three closed roller passes with minimum amount of wasted energy. Since the tube is not required to drive idler rolls, the front end of the tube can pass through the machine with minimum tendency to abort. During passage through the three closed roller passes—the center pass of which is offset in a vertical direction either up or down—all parts of tube in every plane are subject to complex multiple bend cycles. These overcome existing stresses, leaving balanced residual stresses, and a perfectly straight product results. Speed limitations with regard to this straightener are almost nil because of the machine's advanced design.

To realize its full production potential, however, it is necessary that tube mills equip this straightener with entry and delivery tube handling tables carefully designed to suit their specific straightening operations.

Types of Entry Tables

Entry tables offer the greatest challenge to production men. Entry tables must readily accept bent tubing, neatly and safely confine the unstraightened length of tube as it rapidly rotates into and thru the straightener, and at the same time offer the least possible amount of frictional drag to the revolving bent tube. Since smooth and, if possible, fairly soft contact linings in entry device are desirable to avoid abrasive marring of the tube surface, entry tables generally take the form of a long and narrow open top box with an inner lining. Sometimes a lined pipe is used through which bent tube can be continuously fed into straightener.

Boxes are employed where sufficient plant space is not available for the extra feeding length required by pipe feed. Entry boxes, or, as they are sometimes called, whipping troughs, are often equipped with a hinged lid. This may be either manually operated or power operated by solenoid or air cylinder.

If a box is lid equipped, complete operator safety is assured against any possibility of tube emergence while being fed into a straightener. It is desirable that the inside of entry boxes be rounded, with square corners filled in, so lengths of rotating tube do not strike a plane surface. The importance of the best possible design of entry device cannot be overstressed, for in many cases the amount of production obtained from a straightener largely depends on whether entry equipment is good or indifferent.

Requirements are not so demanding on the delivery side of the tube straightener. A simple run-out surface is satisfactory if it has a vertical board on the drive-side edge of the run-out table, against which the tube can spin. The direction of tube rotation, applied by the straightener rolls, makes the tube length tend to climb the vertical board of the angle-type run-out skid.

The effect is that of delivered tube—which normally is perfectly straight—'rifling" out of the straightener. It hugs the corners between the horizontal and vertical surfaces of the run-out angle table. The corners of the table should therefore be sharp. If a large radius is used, the tube will waver because it does not have positive horizontal and vertical planes to support it.

Good practice calls for a smooth lining on both horizontal and vertical portions of the table. Lining should be soft wood, or brass, or resinous material similar to Micarta. By use of this lining, one avoids marring the outside of the tube due to its rotational motion.

For best results, the front end of the skid table should be as close as possible to the final roll pass in the straightening machine. Emerging tube then immediately receives support. In the case of soft tubing, such support is essential because rotational speed of the emerging straightened tube will throw it into a bent condition if it does not receive quick support from the table. Delivery table should, for this reason, be slightly movable both vertically and horizontally at the end nearest the straightener.

Provided with a first-class feeding device and a well designed run-out table, the straightener is capable of duplicating the speed normally obtained by two-plane roller straightening. At this high production speed, all of the straightness and roundness characteristic of good rotary straightening can be achieved.

As evidence that production men have been able to attain this desirable combination of good straightening and good handling equipment, the following results are cited.

Since installing a new tube straightener in its Grand Rapids, Mich. plant, Grand Rapids Hardware Co. has two men turning out more straight tube in one shift per day than six men did in a former two-shift operation. Plant production has climbed as the six driven rolls of the Model AXY machine remove the bends, waves and kinks from 20 ft lengths of stainless steel tubing at the rate of about 200 fpm.

This tube must meet customer specifications of not more than 0.150 in. deviation from straightness per 20 ft length. Grand Rapids has a monthly output of about 200,000 ft of such ¾ in. tube with wall thickness varying from 0.058 to 0.063 in.

The entry table at Grand Rapids is a steel framework topped by a maple "box." This box, with its hinged cover, is about 20 ft long. Machine operator opens cover, flips tube length into box, and the weight of the wood cover keeps it closed against any whip of the tube. Tube leaves entry box and enters a run-in made of 2 in. pipe that is lined with maple.

Working with Titanium Tubing

After passing through this run-in, and between the straightener rolls, the stainless steel tube runs out onto a metal table that has a wood "V" on its top. Lengths of tube spin out into this 20 ft trough. Each length is then lifted out, rolled the width of a 12 in. inspection table, and if meeting this test, dropped into a receiving rack.

This machine's normal maximum production speed of 350 fpm is reduced to keep pace with tube manufacture and bright annealing. Management reports plant's inability to make tube fast enough to keep the straightener working all the time.

Titanium tubing in sizes up to 1¼ in., combining high strength and light weight with good resistance to both heat and corrosion, is successfully being straightened in the Norristown, Pa. plant of Superior Tube Company.

Although 40 per cent lighter in weight, titanium tube is considerably more difficult to straighten than stainless steel. It is well known that titanium has a tendency to seize and gall when being worked with other metals. But, operating procedures were developed by Superior so that only one pass through a Model AXY straightener produced lengths of titanium tubing to closer than commercial specifications for straightness.

Solve Production Problems

Two of these machines at Superior are currently straightening stainless, alloy and carbon steel tube, plus the titanium, having diameters from ⅜ to 1¼ in.; with wall thicknesses ranging from 0.010 to 0.125 in. and in lengths averaging 10 to 30 ft. The straighteners have helped solve two production problems. Superior has found they apply less cold work on tube surfaces than was the case with the company's older straightening equipment. Then too, they are credited with securing an improved product finish as they have no guides to leave objectionable markings on tube surface.

Seamless drawn aluminum tube is being straightened by a Model AX machine in the Baltimore aluminum mill of Revere Copper and Brass Incorporated. A bottleneck existed in the production of ¼ to 1¼ in. aluminum tube, having wall thickness varying from 0.028 to 3/16 in. Two large straightening machines, having production speeds of about 110 fpm, were not keeping pace with the drawing benches and heat treat furnace.

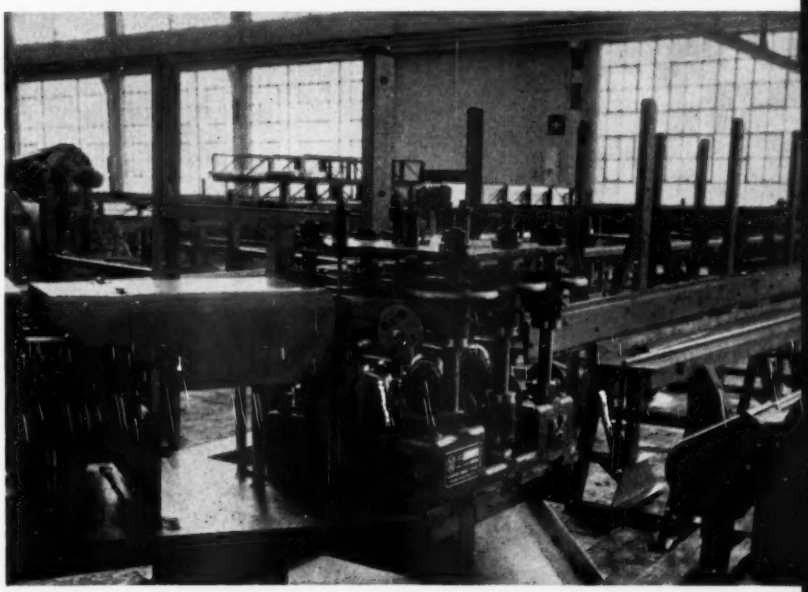
Early in 1952, the new straightener was installed. The bottleneck was broken since the new rotary machine is straightening 60 ft lengths of aluminum tube to meet customer specifications calling for no more than 0.008 in. per ft deviation from straightness, at the rate of 10,000 ft of tube per hour. The new equipment is said to have assured a smooth, clean tube, with reduced set-up time, and has considerably increased plant production.

Straighteners are frequently employed to do jobs other than produce straight tube. For example, there's sometimes need to "doctor" ovaled tube to perfect roundness. French Small Tube Branch of The American Brass Co. has found this equipment most helpful in its plant at Waterbury, Conn.

One such task was ½ in. soft copper tube that was 0.014 in. out-of-round. The rotary straightener brought this tube back to within 0.002 in. of roundness. A similar accomplishment was performed on ½ in. full hard aluminum tube that was 0.011 in. out of round when entering the straightener and within 0.002 of perfect roundness when reaching the run-out table.

(Continued on page 178)

Fig. 3. Rotary straightener equipment in Baltimore plant of Revere Copper and Brass Inc. To the right of machine can be seen the 4 in. by 4 in. run-out trough. It has a slight incline away from the machine and is adjustable up and down



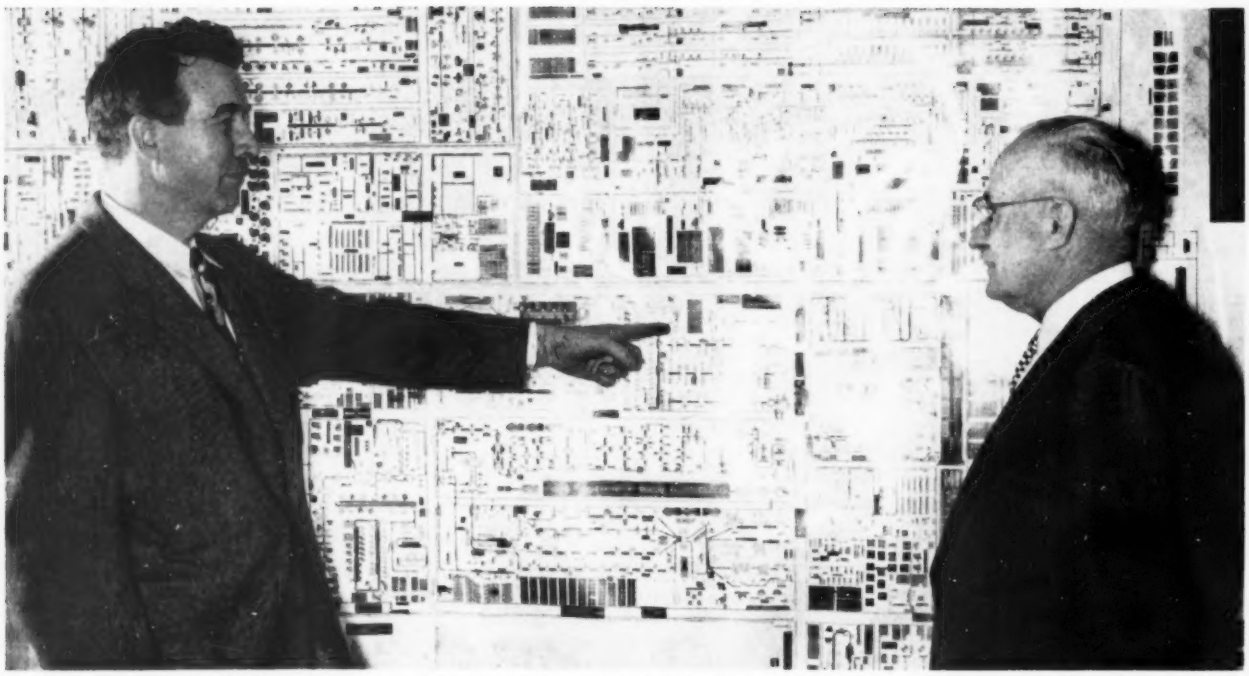


Fig. 1. D. Trans. Div., P. Cartwright, methods-standards director, and G. Chubb, plant engineer stand before Willow Run layout

PLANT ENGINEERS Take Part In "Operation Hydra-Matic"

Willow Run is beehive of activity in race against time to get production going . . . First unit comes off line just twelve weeks after fire destroys plant in Livonia, Mich.

RUINS of the GM Hydra-Matic plant in Livonia, Michigan had hardly enough time to cool when positive steps were taken toward the setting-up of a rehabilitation program for the resumption of production in another location. Out of the preliminary planning on the night of the fire came a concept which was later to be highly instrumental in getting the job done well and quickly. The idea was to use a number of rehabilitation teams independent of each other; each group to handle a specific phase of transmission production.

As plans later materialized, each group was headed by a team captain who was familiar with Hydra-Matic production, having served as general foreman at the Livonia plant. His staff was composed of other men skilled in many operations, who were drawn from the following departments: process; inspection; plant layout; material control; production engineering; and plant engineering. A master mechanic from an outside GM division was also included on each team. The plant engineers, one on each team and numbering about 30, came from GM divisions throughout the country.

It was a big job that the teams had to tackle and whip into shape in a minimum amount of time. With the acquisition of 1,500,000 sq ft of space at Willow Run their efforts went into high gear. Plant layout to fit all the necessary equipment and operations in leased facilities had to have immediate attention. In this phase of the rehabilitation program many layout men from the Detroit Transmission Division took part and were aided by about 20 men from other divisions. These men completed their assignments in an amazingly short time considering the size of the undertaking; only 17½ days elapsed from start to finish. See Fig. 1 and 2. With the completion of the overall layout, each team knew exactly the arrangements of things in its own area.

There are five major divisions in the production set-up of Hydra-Matics. These are as follows: Gear, Case, Control, Assembly and Tool Room. Within each of these departments there is an average number of six sub-divisions representing the various phases of divisional operations. One rehabilitation team was assigned to each of these subdivisions.

Each of the team plant engineers came from one of the GM divisions throughout the country. His temporary responsibilities at Willow Run probably paralleled those in his own plant. The specialized knowledge and experience that he possessed were very valuable to the rehabilitation drive as were those of other team specialists. The plant engineer had to see that his particular area materialized from the planning stage into a working unit in the overall production scheme.

In order to do this, he had to design, requisition material, and write orders. He was concerned with such items as conveyors, exhaust systems, fire protection, washing machines, drying equipment, dust collection, machinery

Fig. 2. Some of 40 layout men on job

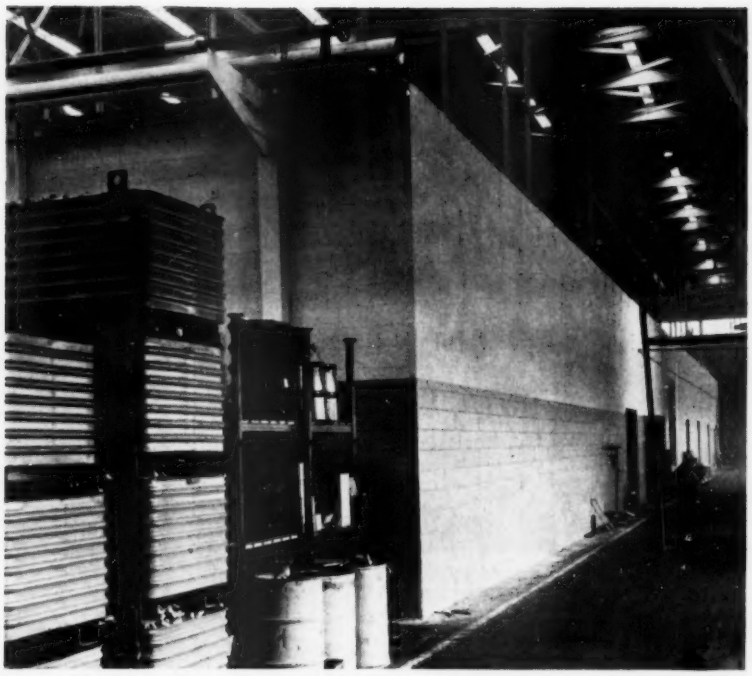


Fig. 3. Block building was erected inside the plant proper for final assembly work

and the installation of machine tools. Some of his design consisted of listening to production people on his team and placing his impressions on drawing paper to be later used by a contractor or by the Argonaut Realty Division which made arrangements for the necessary work. On some of the work he dealt directly with contractors; if necessary he would go to the plant of an equipment manufacturer in quest of his needs.

For the moving, anchoring and wiring of machine tools and other equipment in his area, the team plant engineer would contact the Argonaut Realty Division through a field engineer. This man would do liaison work for one major division or an average of six different plant engineers. The Argonaut Division would then make the necessary arrangements for contract labor.

Close Cooperation

Items that were considered of a general nature where handled by the plant engineering department that is normally a part of the Detroit Transmission Division. The plant layout department also of the same division worked closely with G. W. Chubb, the plant engineer, and his staff. A great deal of this general work went through the Argonaut Division for contract and administration purposes, and completion of some designs. This organization filled the architectural needs as well as supplied supervisors for contractor activities in the field.

The Division plant engineering de-

Fig. 4. Here are some of the many feet of metal duct for air conditioning and pressurizing the "house within a house." Roof design utilizes steel panels

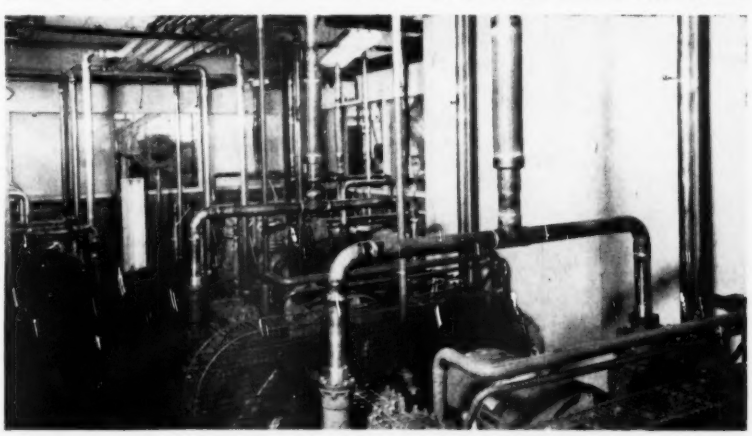


Fig. 5. Mezzanine space in acquired building was used to advantage in locating 40 refrigeration units with 25 hp motor drives for handling assembly area cooling

Fig. 6. These 11 underground tanks each with 15,000 gal capacity have function of storing plant oil and solvent supplies

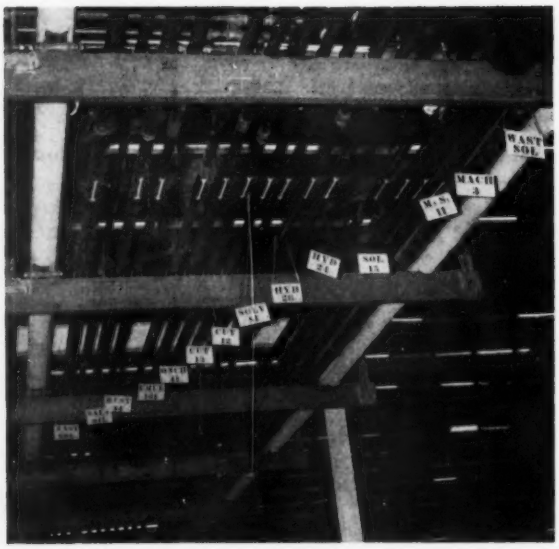


Fig. 7. Bank of pipes which carry fluids overhead from tanks to plant is sample of the piping job that had to be considered

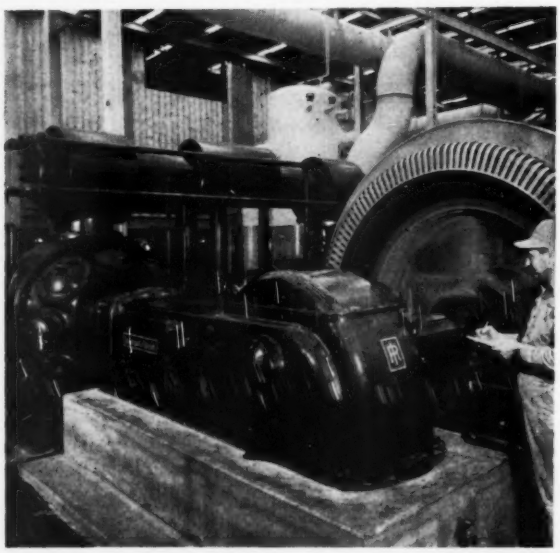
partment was responsible for the design of foundations such as those for the large compressors in the central compressed air system. See Fig. 9. It originated drawings of building changes. It had to consider the setting up of suitable offices for the plant staff. Other items that had to be made ready were plant feeding facilities, dispensaries and tool cribs. Electrical changes in the distribution system was also entrusted to this department along with structural steel work to carry the utilities overhead. See Fig. 8. One of the major projects that it had to tackle was the design of a chip house incorporating various handling equipment. Another big job was the engineering of piping and tank system, Fig. 6 and 7, to handle the many fluids to be used in the plant. It was also involved in an unusual construction project, that of erecting a building within a building. See Fig. 3.

Hydra-Matic parts are so closely machined that in order to be assembled properly, this work must be done under controlled conditions. That was the reason for enclosing the final assembly area. This structure, built of smooth concrete block is 240 ft wide and 600 ft long and about 18 ft high. Its roof is made of sheet metal panels and structural steel. This supports hundreds of feet of sheet metal duct, Fig. 4, which supplies conditioned air for the building at 74 F. The air within this enclosure or assembly room must be as dust free as possible so the building is pressurized to about 4 oz. psi for this reason. The refrigeration job in this air conditioning system is handled by 40 twin compressors, Fig. 5, which have been installed on an existing mezzanine floor. This equipment itself required much piping and electrical work.

Despite the magnitude and complexity of the rehabilitation job, great strides were made in its progress because of the overall cooperative effort. Twelve weeks after the fire, (August 12-November 4), the first transmission was off the line at Willow Run, with ensuing production picking up speed.

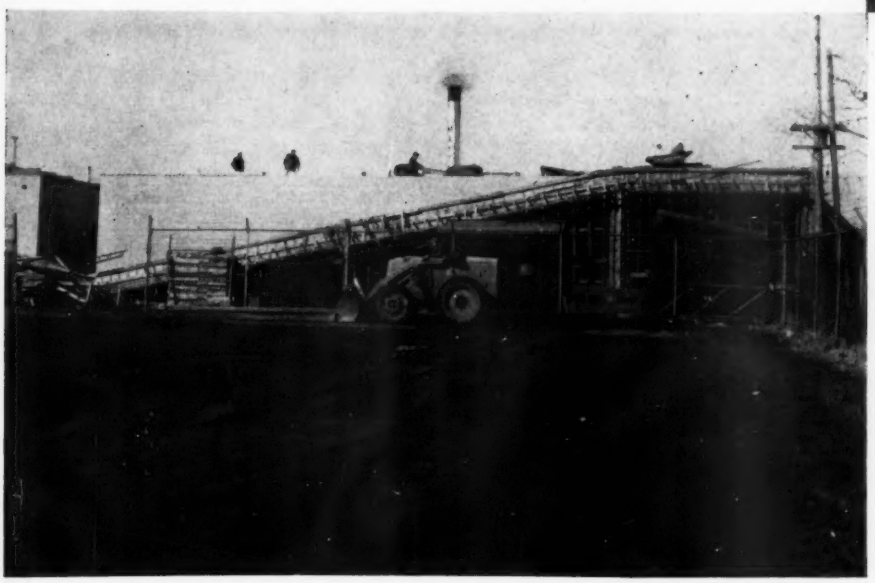
Fig. 8. Changes and additions took place to fit GM needs, among them, extensive steelwork for bus ducts and piping

Fig. 9. This is one of two air compressors that were installed. Each has capacity of 4,500 cfm and is driven by 800 hp motor



ROOFTOP PARKING at Maytag

Not only the roof, but the basement too, is being used at this plant because the building expansion program ate up all available extra space and prevented expansion of parking lot . . . Ramp is the roadway up



Above: Scene in front of the ramp which is to be used by rooftop parkers on the new research building addition. Here workers dump sand between the ramp and the connecting paved drive. Left: Maintenance department closed the parking lot behind the research buildings to resurface lot with cinders and do a thorough job of regrading before allowing use of rooftop facilities

WITH THE ADDITION of a new structure to the Newton, Iowa, Maytag Research and Development Division doubling the present facilities, available parking space around the original Research building was cut considerably. Maytag engineers solved the problem however with a plant parking area on the roof of the new addition providing space for 26 autos. Another parking area in the basement of the new addition will hold 32 automobiles.

Located north of the original Maytag Research Laboratory, the new building, just completed is similar in size and architecture to the original building.

The new addition is windowless and houses laboratories and administrative offices for the research division on the main floor. The building contains fluorescent lighting throughout. Tubular sunlamps placed throughout the building furnish ultra-violet radiation.

Access to the rooftop parking is gained by a ramp leading from the rear of the building. The ramp constructed of reinforced concrete was designed with heating elements laid under the surface of the concrete which will be used for melting ice and snow during the winter.

No steel beams were used in the building thereby saving vertical space for parking on the roof and in the basement. A pushbutton or electronic garage door arrangement in the basement parking area, allows the executive cars to enter or leave the basement parking garage by merely pushing a button on the panel of their autos. The doors open and shut by remote control.

Basement floor of the building is above street level to afford natural draining. The first floor of the addition is 3 ft higher than the original building floor.

Original Maytag Research and Development building contains 15,000 square feet floor space and was constructed in 1944 when the Maytag Company had an annual sales volume of around $70,000,000. As new products have been added the volume has increased to more than $80,000,000. Head of the Maytag Research and Development Division is T. R. Smith, director since 1938.

Addition to the Research and Development Building is built entirely of reinforced concrete. The building is 82 by 120 ft with 13½ in. reinforced concrete basement walls. The basement is hurricane, tornado and bomb proof. Since it has no windows the area is also considered safe against radiation from atom bombs.

Guideposts and warning signals regarding what can be expected in representative interchanges of motors of old and new frame sizes

New NEMA Standard Motors— HOW INTERCHANGEABLE?

DEVELOPMENT OF NEW materials and a cumulative progress in the art of motor design have precipitated an important change in the motor industry—the new NEMA "rerate" program. This program is essentially a new set of standards for motor dimensions which NEMA calls "Suggested Standards for Future" design; these standards cover induction motors from 1 to 30 hp. The results of this rerating program will be smaller induction motors for these horsepower ratings, and the fruits of such a change are obvious: less waste space, higher convenience and usability through less weight and better appearance.

But there are also disadvantages for the motor user. How, asks the user, am I to adapt these new motors to existing uses? Many of the problems involved in this interchangeability of new motors with old are destined to be short-lived, but they are now immediate and some of them are not easy. But they are not impossible to solve.

First of all, just what major changes are being made as a result of this rerate program? In motor parlance it means that two new diameters—the 180 and the 210—have been created and two older diameters—the 200 and the 220—have been discontinued[1]. In addition, it means that the 250 and 280 diameters will remain, but a second frame that is longer than the original has been added. The 320 diameter will continue to exist with the same frame lengths as originally. Of course, in every case where frame sizes have not changed, more horsepower will be packed into the same frame size.

In general, actual diameters of the new motors will average about 13 per cent less than the old motors, and length will average about 11 per cent less. This means that the volume of a new motor will be about two thirds that of an old motor of the same horsepower rating.

Performance-wise, the motor standards will not be changed for any given horsepower rating. The NEMA standards of performance for the new motors and the old are exactly the same. These standards cover temperature rise, pullout torque, starting torque, and locked-ampere ratings. Normally, a new motor of a given rating should perform satisfactorily in any application where an old motor of the same rating is performing satisfactorily. That, briefly, is the essence of the rerate program. The difficulties the user will encounter will be mechanical.

The problem of mechanical interchangeability has two aspects: the first represents the problem of the machine tool manufacturer, and the other, more difficult problem, is that of the user who may have both old and new motors in his plant and may wish to use new motors as spares for the old ones. In the case of the machine tool builder, he will undoubtedly wish to modify the base on which the motor is mounted and make any other necessary changes required when the newer lines are in common use. The problem of the user is not so simple. Naturally, the way to solve these problems is to get down to cases and make direct comparisons between old and new motors of a given rating.

Perhaps the most universal situation will be the attempt to substitute one of the new motors for an old line motor of the same horsepower rating. That case will be considered first here, the differences enumerated and solutions suggested. Table II shows the corresponding dimensions of several motors of the same ratings in both the old and new lines.

First: Shaft Position. If the shaft center is to be retained in the same position, as it is in coupled service, some adjustment must be made to increase the height of the motor, as seen by examining the figures under "D," height of centerline. Steel plates with thicknesses varying from ¼ to 2 in. as indicated in column "ΔD" can be used for this job. The column "ΔD" designates the change in the "D" dimension of new motors over old. As will be seen, these same plates can be used for making the necessary adjustments to attach the motor to the mount.

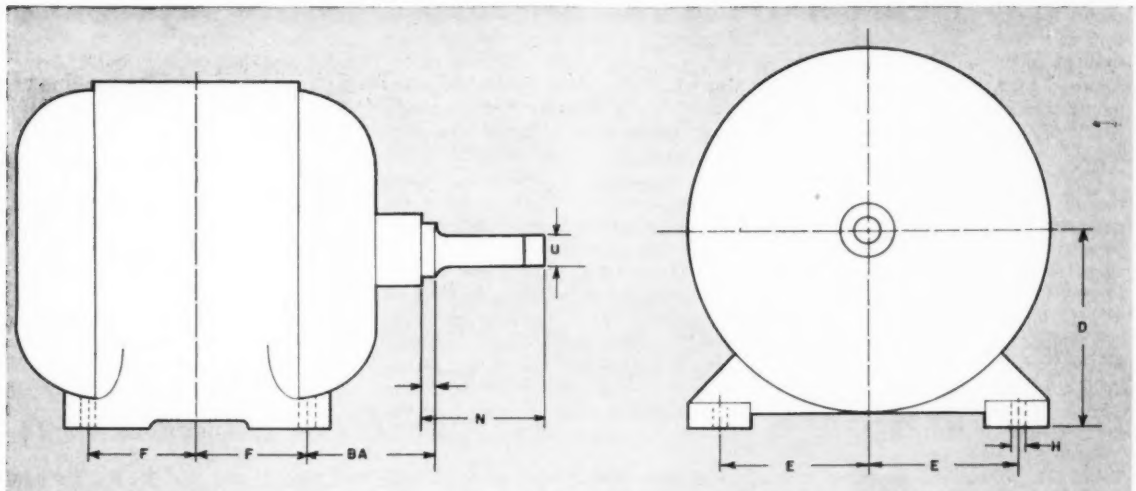
Second: Shaft Diameter. In two-thirds of the cases, the shaft diameter "U" has been changed over old dimen-

[1]The first two digits of a motor frame number are obtained by multiplying the height of the shaft "D" (see table II) by 4. The third digit in the three digit number is the "F" dimension.

Table I. Comparison of dimensions most important in interchangeability

Frame	Standard	D	E	F	BA	H	N-W	U
203	PA	5	4	2¾	3⅛	13/32	2¼	¾
184U	NS	4½	3¾	2¾	2¾	13/32	2¼	⅞
204	PA	5	4	3¼	3⅛	13/32	2¼	¾
184U	NS	4½	3¾	2¾	2¾	13/32	2¼	⅞
224	PA	5½	4½	3⅜	3½	13/32	3	1
215U	NS	5¼	4¼	3½	3½	13/32	3	1⅛
225	PA	5½	4½	3¾	3½	13/32	3	1
215U	NS	5¼	4¼	3½	3½	13/32	3	1⅛
254	PA	6¼	5	4⅛	4¼	17/32	3⅜	1⅛
254U	NS	6¼	5	4⅛	4¼	17/32	3¾	1⅜
284	PA	7	5½	4¾	4¾	17/32	3¾	1¼
284U	NS	7	5½	4¾	4¾	17/32	4⅞	1⅝
324	PA	8	6¼	5¼	5¼	21/32	4⅞	1⅝
324U	NS	8	6¼	5¼	5¼	21/32	5⅝	1⅞
326	PA	8	6¼	6	5¼	21/32	4⅞	1⅝
326U	NS	8	6¼	6	5¼	21/32	5⅝	1⅞

Table II. Corresponding dimensions of foot-mounted motors under the old and new NEMA frame size standards



HP	Speed Syn.	Standard[1]	Frame	D	△D	E	F	BA	H	(N-W)	△(N-W)	U	△U
1	1800	PA	203	5	— 1/2	4	2 3/4	3 1/8	13/32	2 1/4	0	3/4	+1/8
		NS	182U	4 1/2		3 3/4	2 1/4	2 3/4	13/32	2 1/4		7/8	
1 1/2	1800	PA	204	5	— 1/2	4	3 1/4	3 1/8	13/32	2 1/4	0	3/4	+1/8
		NS	184U	4 1/2		3 3/4	2 3/4	2 3/4	13/32	2 1/4		7/8	
2	1800	PA	224	5 1/2	—1	4 1/2	3 3/8	3 1/2	13/32	3	— 3/4	1	—1/8
		NS	184U	4 1/2		3 3/4	2 3/4	2 3/4	13/32	2 1/4		7/8	
3	1800	PA	225	5 1/2	— 1/4	4 1/2	3 3/4	3 1/2	13/32	3	0	1	+1/8
		NS	213U	5 1/4		4 1/4	2 3/4	3 1/2	13/32	3		1 1/8	
5	1800	PA	254	6 1/4	—1	5	4 1/8	4 1/4	17/32	3 3/8	— 3/8	1 1/8	0
		NS	215U	5 1/4		4 1/4	3 1/2	3 1/2	13/32	3		1 1/8	
7 1/2	1800	PA	284	7	— 3/4	5 1/2	4 3/4	4 3/4	17/32	3 3/4	0	1 1/4	+1/8
		NS	254U	6 1/4		5	4 1/8	4 1/4	17/32	3 3/4		1 3/8	
10	1800	PA	324	8	—1 3/4	6 1/4	5 1/4	5 1/4	21/32	4 7/8	—1 1/8	1 5/8	—1/4
		NS	256U	6 1/4		5	5	4 1/4	17/32	3 3/4		1 3/8	
15	1800	PA	326	8	—1	6 1/4	6	5 1/4	21/32	4 7/8	0	1 5/8	0
		NS	284U	7		5 1/2	4 3/4	4 3/4	17/32	4 7/8		1 5/8	
20	1800	PA	364	9	—2	7	5 5/8	5 7/8	21/32	5 5/8	— 3/4	1 7/8	—1/4
		NS	286U	7		5 1/2	5 1/2	4 3/4	17/32	4 7/8		1 5/8	
25	1800	PA	264	9	—1	7	5 5/8	5 7/8	21/32	5 5/8	0	1 7/8	0
		NS	324U	8		6 1/4	5 1/4	5 1/4	21/32	5 5/8		1 7/8	
30	1800	PA	365	9	—1	7	6 1/8	5 7/8	21/32	5 5/8	0	1 7/8	0
		NS	326U	8		6 1/4	6	5 1/4	21/32	5 5/8		1 7/8	

[1] PA—Past Accepted Standards; NS—New Standards

sions. In half of these cases the shaft diameter has been increased. The extent of the changes is shown under column "△U," minus quantities indicating decreases in shaft diameter. In two-thirds of the cases then, changes would have to be made in couplings, pulleys, or gears. If the shaft is too small, a sleeve should be used, and if it is too large, it will be necessary to bore the pulley or gear to the proper diameter. This operation is perhaps the most troublesome in this interchangeability problem, since there is no short method that can be used to circumvent the considerable time involved in making sheaves or boring gears or pulleys to size.

Although not shown here, the same key ways are used for a given shaft in both lines.

Third: Usable Length of Shaft Extension. This dimension is given under (N-W) in Table II. The differences in this dimension normally would not be a source of difficulty with perhaps the exception of coupled motors, where it might affect the positioning of the motor. A review of these figures shows that the same length of shaft extension is used for the same horsepower rating on both lines in approximately two-thirds of the cases. In all cases where the usable length of shaft extension has been changed, the new line has shorter dimensions

than the old. The column △(N - W) shows the extent of these changes. Of course, in cases where the shaft ends must be in the same position, the only solution here is to so position the motor that shaft end position on the new motor coincides with that of the old.

Fourth: Bolt Locations. The location of the two bolts nearest the shaft extension that hold the motor to the foundation are affected. If it is assumed that the motors are to be so located that the shoulder on the shafts of both old and new lines are to have the same location, it will be necessary in the great majority of the cases to drill new holes for motor mounting. The dimensions concerned with these holes are: "E," "BA," and "H." Inspection of these dimensions in Tables I and II show that it would not be necessary to plug any existing holes in motor foundations with the exception of the three horsepower 1750 rpm motors. Of course, these same conditions would exist if the motors were so located as to have the ends of the shaft extensions at the same place.

The other two holes, required in the base for mounting, are so different in location in new and old motors that new holes must always be drilled. There will never be a need to plug old holes in this case.

Fifth: The Conduit Box. The location of the conduit box is not standardized so changes may be needed in conduit positions in changing from the old line motors to the new line. For that matter, such changes may also be required even now when interchanges are made between different types of motors of the present line.

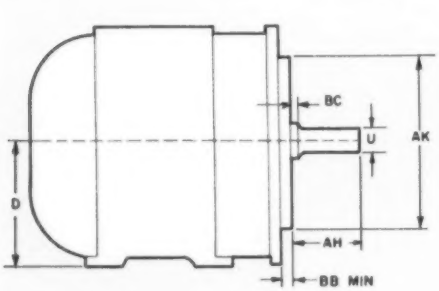
For this case, then, in substitution of a new motor for an old one, these things will be involved:

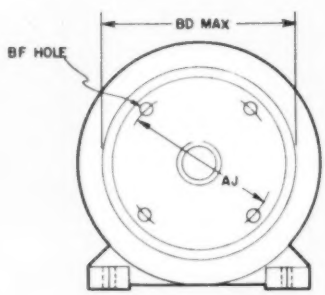
1. Always adding plates under the feet.
2. Drilling and tapping four new holes in the base.

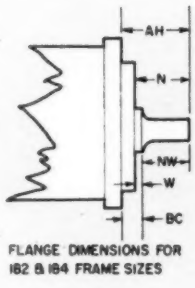
In addition, such substitutions may also involve: (1) Changes in couplings or pulleys or gears in approximately two-thirds of the cases. (2) Plugging two holes in the foundations for the motor in approximately 10 per cent of the cases. (3) A possible change in conduit.

How about the possibilities of re-

Table III. Significant mounting dimensions of type C face mounted motors for both the old and new NEMA standards



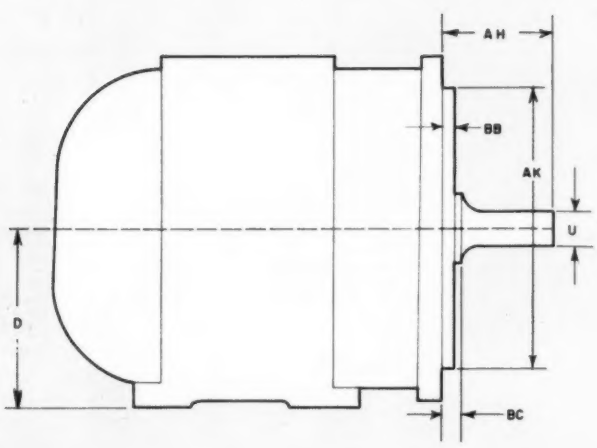


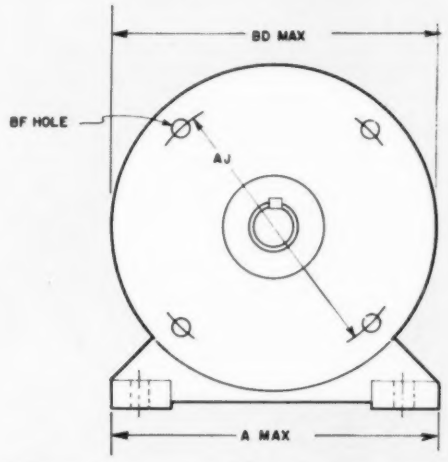


HP	Speed Syn	Standard	Frame	AJ	△AJ	AK	△AK	BB	BC	BD Max.	U	AH	△AH
1	1800	PA	203C	7 1/4	−1 3/8	8 1/2	−4	1/4 Min.	1/16	9	3/4	2 5/16	− 3/16
		NS	182UC	5 7/8		4 1/2		5/32 Max.	−1/8	6 1/2*	7/8	2 1/8	
1 1/2	1800	PA	204C	7 1/4	−1 3/8	8 1/2	−4	1/4 Min.	1/16	9	3/4	2 5/16	− 3/16
		NS	184UC	5 7/8		4 1/2		5/32 Max.	−1/8	6 1/2*	7/8	2 1/8	
2	1800	PA	224C	7 1/4	−1 3/8	8 1/2	−4	1/4 Min.	1/8	9	1	3 1/8	−1
		NS	184UC	5 7/8		4 1/2		5/32 Max.	−1/8	6 1/2*	7/8	2 1/8	
3	1800	PA	225C	7 1/4	0	8 1/2	0	1/4 Min.	1/8	9	1	3 1/8	− 3/8
		NS	213UC	7 1/4		8 1/2		1/4 Min.	−1/4	9	1 1/8	2 3/4	
5	1800	PA	254C	7 1/4	0	8 1/2	0	1/4 Min.	3/8	10	1 1/8	3 3/4	−1
		NS	215UC	7 1/4		8 1/2		1/4 Min.	−1/4	9	1 1/8	2 3/4	
7 1/2	1800	PA	284C	9	−1 3/4	10 1/2	−2	1/4 Min.	1 1/16	11 1/4	1 1/4	4 7/16	− 1/16
		NS	254UC	7 1/4		8 1/2		1/4 Min.	−1/4	10	1 3/8	3 1/2	
10	1800	PA	324C	9	−1 3/4	10 1/2	−2	1/4 Min.	7/16	12 1/2	1 5/8	5 5/16	−1 1/16
		NS	256UC	7 1/4		8 1/2		1/4 Min.	−1/4	10	1 3/8	3 1/2	
15	1800	PA	326C	9	0	10 1/2	0	1/4 Min.	7/16	12 1/2	1 5/8	5 5/16	− 1/16
		NS	284UC	9		10 1/2		1/4 Min.	−1/4	11 1/4	1 5/8	4 5/8	
20	1800	PA	364C	11	−2	12 1/2	−2	1/4 Min.	−1/4	14	1 7/8	5 3/8	− 3/4
		NS	286UC	9		10 1/2		1/4 Min.	−1/4	11 1/4	1 5/8	4 5/8	
25	1800	PA	364C	11	0	12 1/2	0	1/4 Min.	−1/4	14	1 7/8	5 3/8	0
		NS	324UC	11		12 1/2		1/4 Min.	−1/4	14	1 7/8	5 3/8	
30	1800	PA	365C	11	0	12 1/2	0	1/4 Min.	−1/4	14	1 7/8	5 3/8	0
		NS	326UC	11		12 1/2		1/4 Min.	−1/4	14	1 7/8	5 3/8	

* nominal—for 182UC and 184UC frames only.

Table IV. Important mounting dimensions for interchangeability of Type D flange mounted motors for both standards





HP	Speed Syn.	Standard	Frame	AK	AJ	BD	AH	△AH	BC	BB Max.	U	Clearance Hole BF Size	No.
1	1800	PA	203D	9	10	11	2 1/4	0	0	1/4	3/4	17/32	4
		NS	182UD	9	10	11	2 1/4	0	0	1/4	7/8	17/32	4
1 1/2	1800	PA	204D	9	10	11	2 1/4	0	0	1/4	3/4	17/32	4
		NS	184UD	9	10	11	2 1/4	0	0	1/4	7/8	17/32	4
2	1800	PA	224D	9	10	11	3	— 3/4	0	1/4	1	17/32	4
		NS	184UD	9	10	11	2 1/4		0	1/4	7/8	17/32	4
3	1800	PA	225D	9	10	11	3	0	0	1/4	1	17/32	4
		NS	213UD	9	10	11	3	0	0	1/4	1 1/8	17/32	4
5	1800	PA	254D	9	10	11	3 3/8	— 3/8	0	1/4	1 1/8	17/32	4
		NS	215UD	9	10	11	3		0	1/4	1 1/8	17/32	4
7 1/2	1800	PA	284D	11	12 1/2	14	3 3/4	0	0	1/4	1 1/4	13/16	4
		NS	254UD	11	12 1/2	14	3 3/4	0	0	1/4	1 3/8	13/16	4
10	1800	PA	324D	11	12 1/2	14	4 7/8	— 1 1/8	0	1/4	1 5/8	13/16	4
		NS	256UD	11	12 1/2	14	3 3/4		0	1/4	1 3/8	13/16	4
15	1800	PA	326D	11	12 1/2	14	4 7/8	0	0	1/4	1 5/8	13/16	4
		NS	284UD	11	12 1/2	14	4 7/8	0	0	1/4	1 5/8	13/16	4
20	1800	PA	364D	14	16	18	5 5/8	— 3/4	0	1/4	1 7/8	13/16	4
		NS	286UD	11	12 1/2	14	4 7/8		0	1/4	1 5/8	13/16	4
25	1800	PA	364D	14	16	18	5 5/8	0	0	1/4	1 7/8	13/16	4
		NS	324UD	14	16	18	5 5/8	0	0	1/4	1 7/8	13/16	4
30	1800	PA	365D	14	16	18	5 5/8	0	0	1/4	1 7/8	13/16	4
		NS	326UD	14	16	18	5 5/8	0	0	1/4	1 7/8	13/16	4

placing an old motor with a new one not necessarily of the same horsepower rating, but with one that is most nearly mechanically interchangeable? Let's look at this case.

Table I gives a comparison of the dimensions that are most important from an interchangeability standpoint.

This table has associated the frames of the old line and the frames of the new that would be most nearly interchangeable with them. First of all, in contemplating such a substitution, the control has to be checked to see if it can handle the larger horsepower.

Then, close inspection of the table shows that there are not only no advantages but also handicaps to this type of interchangeability. In the cases of diameters 203, 204, 224, and 225, all couplings must be changed, more old holes plugged, and changes of control may be involved. Substitution of a new motor for an old one that is most nearly mechanically interchangeable with it appears to be much less desirable than substitution on the basis of horsepower rating. From diameter 254 up, however, the only mechanical changes required would be changes in couplings, possible shortening of shafts, and possible changes in control.

All the discussion here has so far been confined to foot mounted motors. Some users will also have difficulty with face and flange mounted motors. Let's look at type C face mounted motors first.

(Continued on page 174)

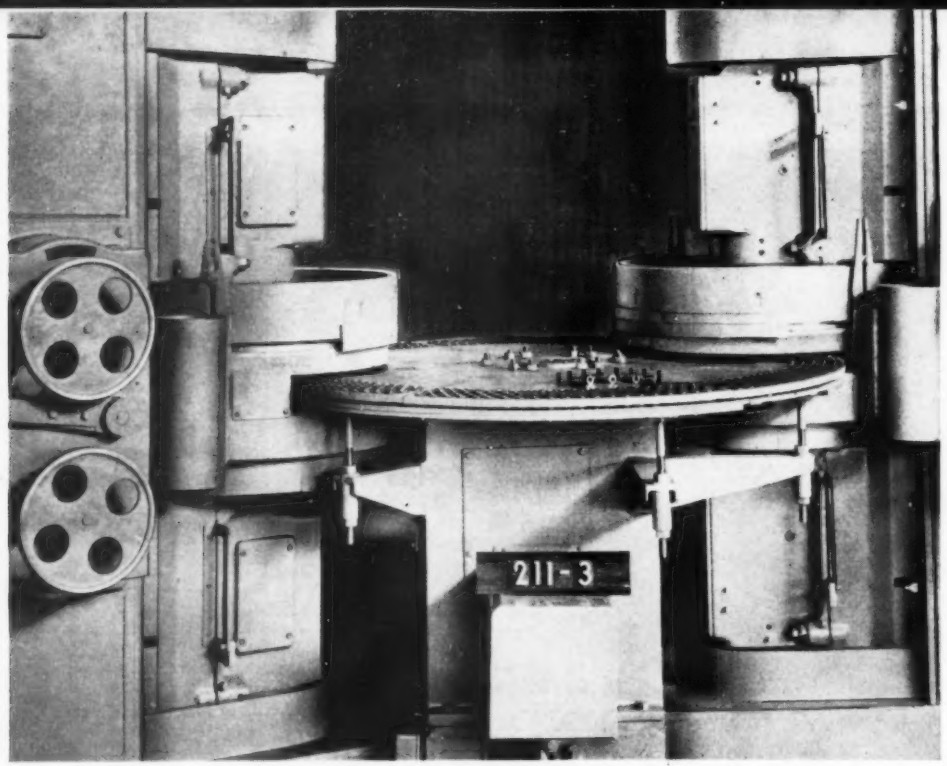


Fig. 1. Continuous production, double unit, spring grinder with pairs of vertical opposed spindles, employing a ferris wheel. The work is manually loaded and it passes between two parallel-mounted disc wheels. These machines are employed to produce close tolerance fine finish work such as wrenches

Guide to DISC GRINDING

Part II. Fiber-bonded discs and coated abrasives . . . Efficient operating speeds for abrasive discs . . . Dressing disc wheels and tools for dressing . . . Vertical spindle grinders, horizontal disc grinders, portable grinders . . . Types of coated abrasive discs, their selection and application . . . Use of sander pads

By HARRY J. PROSSER, Bonded Products and Grain Division, and JOSEPH R. O'NEILL, Coated Products Div., The Carborundum Co.

REQUIREMENTS FOR double-disc grinders are somewhat more complex than for single-disc machines. Grinding two opposite surfaces simultaneously, especially where the work is relatively thin and the area of contact large, calls for an even more exact selection of disc specifications (abrasive, grit size, grade, structure, and bond). Figure 1 shows a double unit.

It is advisable, in some instances (as mentioned in Part I), to use discs of a composite type, made with a combination of specifications to insure uniform cutting action and rate of wear from periphery to hole.

Sometimes the two-spindle grinder is designed to feed the work across the center portion of abrasive discs which have either a small hole or no hole at all. As the work approaches the center of the discs, the greatly reduced grinding speed drops below the recommended minimum and the resulting rubbing action, rather than true abrading action, has little grinding effect on the work. The discs tend to wear conically, high in the center. The use of discs made with a center zone one or two grades softer than the adjacent section, corrects this condition and avoids the need for frequent and costly dressing in order to keep the discs flat.

Efficient Speeds

The most efficient operating speed for abrasive discs in most cases is 6,000 surface feet per minute, or less. Higher speeds are seldom required for maximum efficiency, even though the discs may be strong enough to run faster without danger.

A basic rule to follow is: "The maximum speed approved by the wheel manufacturer and marked on the tags should not be exceeded." For best grinding results abrasive discs are frequently operated at speeds lower than the indicated maximums.

Where it is possible to make adjustments in the speeds used, it is well to remember that when the wheel speed is increased, and all other movements kept constant, the wheel will act harder. Conversely, if the wheel speed is decreased and all movements are kept constant, the wheel will act softer.

Each time a new disc is mounted, the maximum speed for the disc should be checked against the speed of the machine to insure that the machine spindle speed is not in excess of that recommended for the disc. To this end it is helpful to attach a permanent plate to each machine indicating the actual spindle speed.

It is important that the machine spindle speed is not changed inadvertently during repair of machine.

It is necessary, from time to time, to dress the abrasive wheel to insure the proper finish of the work; particularly when the stock being ground is aluminum or some other metal of relatively low tensile strength. The purpose of dressing is to open the face of the disc by dislodging metal particles embedded in the surface, to produce a free, quick-cutting action and to true the surface to a perfect plane. Shown in Fig. 2 are several types of hand dressing tools.

If discs of the proper grit and grade are used, much of the dressing can be eliminated—or no dressing at all is required—in most cases, since the work itself provides sufficient dressing action. There are times, however, where large flat surfaces are being ground, when the discs have a tendency to glaze, and dressing becomes necessary.

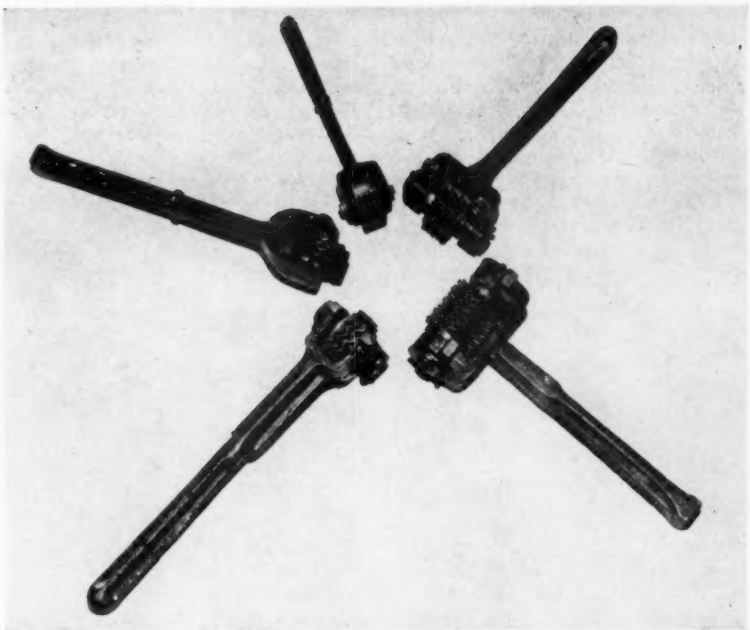


Fig. 2. Several types of disc wheel hand dressing tools. Specially designed tools are also available for truing abrasive discs on both vertical and horizontal grinders

Vertical Spindle Grinders

Apart from the ordinary hand dresser of the Huntington type there are various other dressing tools, specially designed, for truing abrasive discs on both vertical and horizontal grinders.

For touching up a disc that is dull or glazed, a star or corrugated wheel dresser is frequently used. Dressers are also made with two sets of cutters for use on double disc grinders for touching up both discs at the same time. Touching up a disc by hand will not produce an accurate plane, however, since the hand dresser tends to follow irregularities of the surface.

Where a perfect plane is essential, some form of rigid support for the dresser must be provided. Manufacturers of disc grinding machinery supply various devices for this purpose.

For use on double wheel, single spindle machines, a rigid dressing tool is mounted on a steel bar which can be bolted to the work table of the machine. This provides a much more accurate means of dressing the two discs of a machine of this type than does the ordinary hand dresser. It slides on ways which are accurately planed, and thereby insures the wheels being dressed absolutely parallel, rather than permitting the dresser to follow any irregularities as a hand dresser may often do.

Horizontal Disc Grinders

One disc dresser assembly consists of a crossbar, 4 in. wide and 1 in. thick, which is mounted at each end on the guard ring of tub-type machines. A sliding block carrying the wheel cutter is drawn back and forth across the abrasive disc by means of a push rod. Screw adjustment is provided for feeding cutter into the disc.

The dressers or cutting tools used are of the star or corrugated wheel type, usually ball-bearing mounted. When more accurate surfaces are desired, it is necessary to use a diamond dresser. For accurate work, the dresser should be equipped with a screw or hydraulic feed as different degrees of openness of surface can be obtained by this feeding device.

To satisfy the needs of portable grinding, The Carborundum Company developed the MX line of fiber-bonded discs, which, because of their unique composition differ from conventional grinding wheels in performance. These MX products are made of uniformly graded abrasive grain intermingled with cotton fibers and held together with a strong organic bond. This bond is the outstanding feature of MX's industrial adaptability, providing a fast-cutting action that is extremely soft and clean—yet sufficiently rugged to perform certain heavy duty operations. One of these discs is pictured, in use, in Fig. 3.

These MX discs provide an economical medium for weld grinding and stock removal operations, including the cleaning-up of iron castings, removing burrs, smoothing torch cuts, punch marks, sheared edges and jagged ends of metal parts, beveling, removing scale, rust or acid stains from sheets of flat stock or slightly contoured surfaces. They are also effective for cleaning out channels, interior seams of welds and corner welds.

The disc are operated at speeds between 8500 and 12,000 sfpm. They are applied to the work surface with light pressure at an angle of 10 to 45 deg for fast metal removal. They may be used flat against the work surface for final blending. MX discs are used on standard high-speed portable disc sanders and on both air and electrically-driven 90 deg portable grinders.

Coated Abrasive Discs

Our company's Coated Products Division manufactures two general types of sanding discs for use in maintenance and production work. Resin sander discs in grits 24 and 36 are generally used for weld and heavy burr removal and grits 50 and finer are used for work on clean-up of rust, removal of old paint, as well as flat work on metal parts. Finer grits are usually used where metal finishing must be accomplished.

On certain applications, the glue-bonded sander disc hase proven more effective than the resin products, particularly where a relatively flat or surfacing operation is to be accomplished. On the other hand, where severe dressing is encountered, the resin disc is most acceptable because of its resistance to stripping and bond softening.

The glue bonded sander disc is perhaps more versatile in the maintenance field because of its flexibility and adaptability for many types of jobs whether it be clean-up of rust spots, old paint removal, burring or weld grinding.

Speeds generally recommended for most operations with sander discs are in the neighborhood of 8500 sfpm. This

has proven to be most satisfactory under general conditions, although on certain operations, such as solder grinding, better results have been obtained at speeds approaching 4500 sfpm.

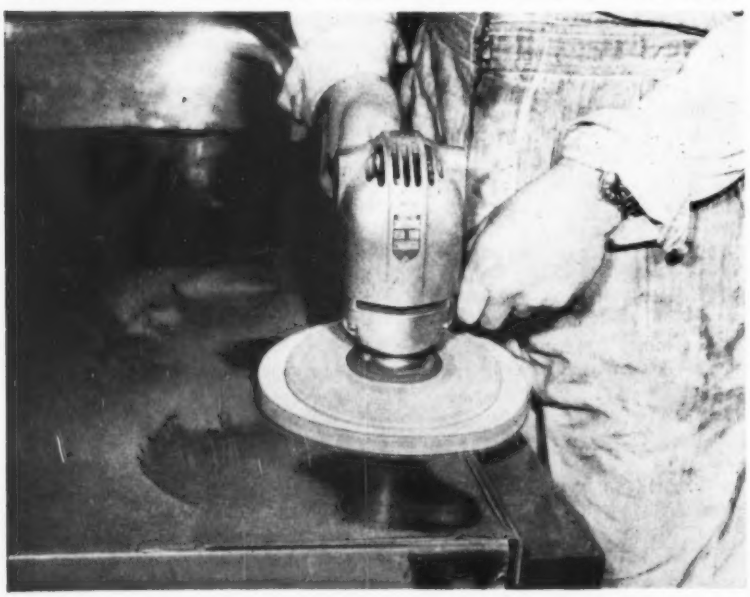
It has become an increasing practice in the maintenance and production fields for cost-conscious users to trim discs to successively smaller sizes. This can be readily accomplished and there are cutters on the market for this purpose. If discs are to be trimmed, it is most efficient to perform the grinding close to the edge of the disc, so that more successive cut downs can be accomplished with the same disc.

The choice of a sander pad is extremely important and to meet the hard use and punishment encountered in heavy duty applications, such as grinding welds and heavy burrs, we have designed a sturdy, rugged pad. It is available in tapered form (varied thickness across the radius) for uses where flexibility is desired, and comes in 5, 6, 7, 8 and 9-in. diameter sizes. For flat work applications, a straight type of pad is provided in 7 and 9-in. diameters.

Another pad, intended for light-work requirements, is also available, in 1-in. increments, ranging from 4-in. to 9-in. in diameter. Wherever possible, it is best to use a pad which will closely approximate full support of the sanding disc, to avoid excessive flexing of the disc. It is normally recommended that a nominal 9-in. pad be used with a 9-in. disc and a 7-in. pad be used with a 7-in. disc. Where difficult contours are to be maintained, some deviation from this general rule must be expected.

Fig. 3. Numerous maintenance jobs can be handled rapidly and effectively with a portable fiber-bonded abrasive disc such as this. Operator smooths weld on a repair

Fig. 4. Surface-finishing a steel bench top with a flexible-backed pad, using a 40-grit metal cloth abrasive disc. Portable tools are handy for heavy objects



Precoated Pads

The question often arises on a particular application as to whether the resin sander disc or glue-bond sander disc should be used. Generally, if it is a rough weld, burrs, torch cuts, etc., resin sander discs are more economical. If, however, the weld is light and the disc tends to glaze rather than break down and expose new grains, then the sander disc ALO M should be used on the application. On surfacing operations, the glue-bond sander discs are generally preferred but should stripping result then it would be practical to use the resin disc.

For the removal of paint, sanding of prime, removal of orange peel, two rubber-disc coated abrasive tools, known as the Fastcut and Flexbac pads, have proven extremely valuable. Where repainting is to be done on cabinets, machines, and the like, a Flexbac pad is used with 80 grit waterproof paper discs.

Both pads consist of resilient rubber that is precoated with pressure-sensitive adhesive so that sanding discs can be readily applied to the surface without the need for additional adhesive. Several discs may be adhered to the surface before it is necessary to reactivate the base adhesive coat.

The unusual degree of flexibility of the Flexbac pad allows it to follow the most difficult contours, and due to the fact that no point pressure is generated, a perfect feathered-edge results. For the sanding of prime, either 280 or 320 grit waterproof paper is usually used and in the removal of orange peel (on final color coats) grits 360 and finer are employed.

The Fastcut pad is somewhat more aggressive than the Flexbac pad and is used for removal of small imperfections on metal parts. Both pads are designed to operate at 1500 rpm. There are several slow speed tools available that can be used with these pads.

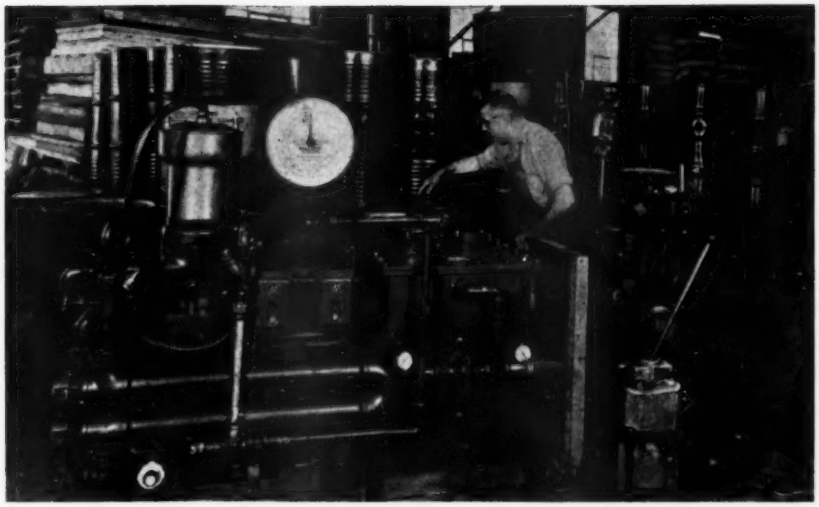


Fig. 1. Specially-designed centrifuge and filter block is used to salvage hydraulic and spindle oils, rust-proofing compounds, and some acids. Unit is portable; it is mounted on a skid for handling by fork truck

Fig. 2. Salvaging of bar ends means additional savings. Operator is here cutting bar ends which are a by-product of automatic bar machines. Ends are cut to exact weight and are sent to forge shop for further processing. Operator in rear is cutting cardboard for re-use as protective packaging spacers

Salvage Systems Must Salvage— But Eliminate Need for Salvage, Too

By EDWIN S. CONNOR, Supervisor of Salvage, Axle Division, Eaton Manufacturing Company

FEW AREAS of cost reduction remain available to American industry today. But one of these, and an often overlooked area for big savings, is effective salvage. The most important point to remember in such a program is that good operation doesn't begin with the salvage department, but rather, at the source of the operation. In other words, it is vital not only to find uses for salvage materials, but also to investigate the causes and eliminate them at source.

The main causes of salvage are: (1) Waste arising from misuse of machine tools, materials, and other equipment; (2) Inexperience and carelessness on the part of operators; (3) By-products of normal daily operations; (4) Normal expected daily wear on equipment.

Principal goals of a salvage program should be: (1) to see that all scrap and waste from productive and non-productive processes are handled as efficiently and profitably as possible; (2) to obtain the maximum re-use from all salvageable materials; (3) to eliminate all avoidable waste and wasteful practices through instruction, training, inspection and control at the source of the waste; (4) to guide workers into more careful and efficient handling of materials and save man-hours by careful usage; and (5) to encourage an attitude on the part of the supervisors favorable to the continuance of conservation methods. The use of the word "conservation" at this point as a better name than "salvage" is favored because conservation attacks the inefficiency at its source.

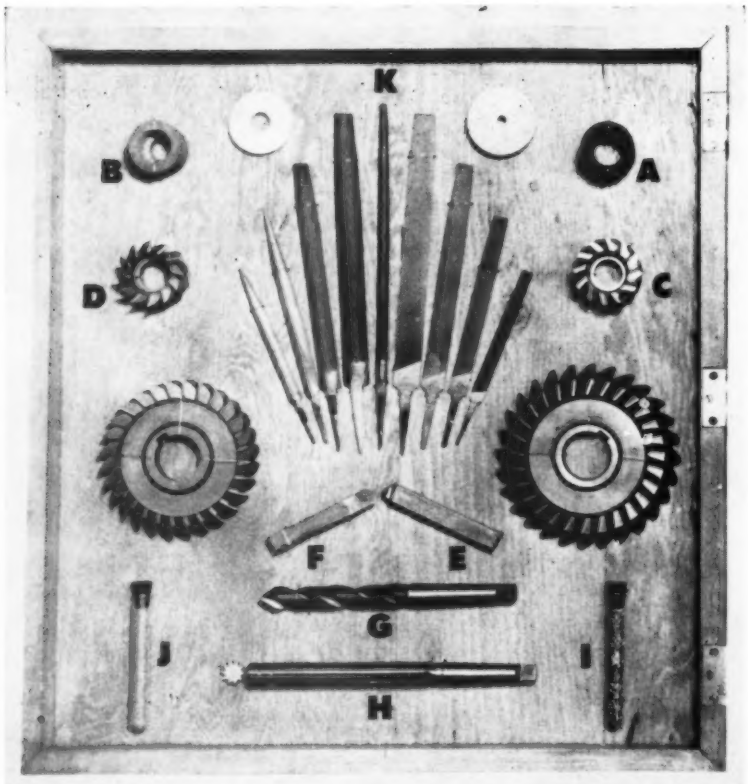


Fig. 3. Typical examples of economies inherent in effective salvage: A. Worn grinding wheel; B. Similar wheel after re-working; C. Milling cutter; D. Similar cutter re-worked to a smaller size; E. Carbide-tipped tool bit; F. Similar bit re-worked; G. A good shank from a broken drill is brazed onto a good cutting section from another broken drill; H. A reclaimed upset reamer; I. Mixture of non-ferrous metals as originally collected; J. Non-ferrous metals given higher value by the salvage operation of separation; K. Re-worked files of all types

In setting up any salvage program, management must be sold on its merits —must appreciate the potential savings. An effective salvage operation is by no means restricted to large companies as some think. Waste is a problem for big firms and small firms alike and solutions to this problem can be equally as profitable.

Efficiency Means Savings

In the past, top management of many firms has not been too cognizant of the tremendous savings latent in an efficient salvage program. At Eaton, however, we feel that a dollar saved is better than a dollar earned. For example, in order to earn a dollar, it is necessary to find a customer, sell him, then complete such necessary steps as manufacturing, shipping and collection. Saving, on the other hand, is comparatively easy, entailing little except being alert to wasteful practices, and devising means to eliminate them.

As an example, the Axle Division of Eaton Manufacturing Company is customarily invoiced for most vendors' pallets, drums, carboys, etc. By assigning personnel (under the direction of the Salvage Department), to see that these containers are returned, the Division received credit in excess of $100,000 in 1952. Although this figure is not carried as savings through salvage, without this supervision, much of this latent savings would be lost.

Where, however, incoming containers are figured as part of the cost of the material contained, it is the responsibility of the Salvage Department to determine additional uses for such containers (thereby allowing the Division to equalize the revenue spent, in addition to providing valuable property for the Company itself). In accordance with such thinking, the Salvage Department specifies the type and size container in which it wishes to receive certain goods. Such containers can then be used for handling within the plant, or can be sent to other vendors to receive still additional loads.

The success of any salvage program depends on the way it is presented to the supervisory and operating personnel of a plant. The men must understand the purpose of the program, how they may participate in it, and how they may benefit from it. To this end, education and supervision is vital. Continuous education is a must.

When our salvage department was established, we held meetings with supervisors and workers, explaining aims of the department and the plans that were to be carried out to conserve material. Cooperation was asked of everyone in the plant. Posters, bulletins and signs were placed in prominent locations, and articles were written for our Company house organ and factory paper. This combination program helped to dramatize the opening of the new department in order to impress on every worker that waste is intolerable and could be stopped, if everyone cooperated.

Workers Offer Ideas

Here at Eaton, we go right to the men on the line. Many of our ideas come directly from these men, workers who are continuously concentrating on their specific jobs. Of necessity, these men know their operations better than we could ever hope to; are in a better position to offer suggestions on more effective procedures. We take extreme care to develop and keep open, two-way lines of communication between the workers and our department. Without this 100 per cent, two-way communication system, an entire salvage program could dissolve.

Eaton's suggestion system has paid off. Such ideas are submitted on standard forms. Not only does the Salvage Department benefit, but top management can also see the benefits (to both operators and management), of such a system. Rather than the Salvage Department taking credit for ideas presented to it, the originator is encouraged, if the idea has merit, to resubmit it through normal channels so that he himself gets the credit.

A specific example: in one instance, the Division was able to reduce the cost of socket wrenches from $720 to $150 per year. In this case, a worker suggested a method of reducing the bolt head size, thereby increasing the life of the socket wrenches. Total savings per year amounted to $570. While this is a small individual savings, it is nevertheless indicative of the potential savings overall.

The problem of using re-worked tools is one that confronts most Salvage Departments. Employees prefer to work with new tools. In addition to merely fixing up a tool, it also must be dressed up. We know that our workmen are aware of which tools are really re-worked. Yet, there is a

certain psychological factor that makes it vital to have such tools looking like new.

For example, when milling cutters are recut, they are acid etched and the cutting teeth repolished to simulate the appearance of a new tool. Recut files are wrapped exactly as new files; even the ends are repainted in the same colors as the original manufacturer. The small additional cost is negligible in the overall picture but the hesitancy on the part of an operator in using a reworked tool is minimized. This appearance factor is an important facet of human nature—and it pays off. I cannot overemphasize the importance of this often overlooked angle of salvage operations.

Education is based equally at both supervisory and operating personnel. However, when we contact the workers, their immediate supervisors know what we are doing at all times. In no cases are supervisory personnel slighted or side-tracked. This is important.

At the beginning of this report, we mentioned that one of the principal causes of salvage are the by-products of normal daily operations. Such an example is shown in Eaton's program for disposing of chips, borings, turnings, etc., which are generated by manufacturing processes. In addition, a highly effective system has been set up for the reclaiming of cutting oils which are usually found with much of the above mentioned material.

It is a known fact that scrap dealers realize much of their profit from the segregation of various types of scrap in their yards. To increase the savings from scrap disposal, Eaton personnel do their own segregation. In addition, through the installation of a modern scrap handling system, this material is moved from the originating sites, the cutting oils reclaimed (further adding to the worth of the scrap), and the scrap automatically conveyed into waiting rail cars.

Typical Salvage

As proof of the savings from such operations, the first 20 months of the new scrap handling system resulted in a total gross savings of more than $235,000 for the Axle Division. Value of reclaimed cutting oils alone amounted to more than $53,000. And the total net savings, after deducting total original capital investment plus maintenance, was better than $151,000.

Apart from daily by-products, the normal wear on machine tools can mean a job for the Salvage Department. For example, grinding wheels are reshaped for other applications as long as the grit, grade and bond can still be utilized.

Additional examples of salvaging of machine tools include the welding of broken drills, milling cutters and reamers. When such tools can no longer be used for production, most tool rooms can utilize them due to the universal type of machines and the great variety of work performed.

Metallizing and chrome plating play an important part in reducing costs in machine repair departments. Many spindles can be metallized and the end result may be exceptionally advantageous. For example, due to the porosity of the sprayed metal itself, metallizing acts to give parts a better oil reservoir, thus giving longer life than the original part. Metallizing is often used as a protective coating against acid action.

Chrome plating has an advantage where extremely hard surfaces are vital and where warpage is not permitted. Examples: burnishing broaches, drill bushings, pilots, plug gages, and some types of spindles. Hard facing is prescribed where depth is necessary and when warpage or mis-alignment can be reground concentric to parallel lines.

To guarantee a successful salvage program, a company must hire a competent man, give him adequate space for his stock and working area, a small amount of necessary equipment, and a small force of good men. With this set-up, the company should realize a minimum of three dollars for every dollar spent on salvage.

Of great importance: the Supervisor of Salvage must have rank comparable to that of a General Foreman so that he has the necessary authority to correctly administer his duties.

Be "Conservation Conscious"

However, the Salvage Supervisor cannot run a one-man show and get any worthwhile results. As stated, his big job is to get every worker "conservation conscious" so there is as much pride in a low spoilage record and good housekeeping as there is in a high production record.

Real leadership is necessary to carry out a successful conservation program. It requires more than sporadic drives on waste. It calls for persistent, daily effort, for "saving at the source." By intelligent and diplomatic guidance on the part of Salvage personnel, each man in the plant can be made to feel a greater pride in his own efforts.

Naturally, this human relations work must be done by a person who understands human nature, how to deal with

(Continued on page 170)

Fig. 4. Effective scrap collection has meant tremendous savings for Eaton Axle. For example, during the first 20 months of operation of a new scrap handling system, Eaton realized total savings of more than $182,000 from this new program

LOW COST MOLDS for Cast Resin Parts

Advantages listed by author for this process are: Little or no pressure or heat required; molds may be very simple and relatively inexpensive; no costly molding presses or facilities are required; relatively unskilled labor used

By **SIDNEY S. CHARSCHAN**, Development Engineer Western Electric Company, Inc., Kearny, N. J.

AVAILABILITY of a variety of casting resins which can be solidified with little or no pressure and heat has led to a new method of manufacturing plastic parts which requires no expensive molding machines and relatively few facilities. Upon the addition of certain polymerizing agents, these compounds may be poured into molds and hardened with or without the external application of heat to produce useful forms having excellent electrical characteristics and good structural and protective properties.

Although the cost per pound of the resin used at our Kearny plant is higher than that of ordinary plastics, casting resins are now used economically where the number of parts to be manufactured per year is too low to justify conventional high pressure molding with its semi-skilled labor and high tooling costs, and where fabrication by machining and assembly would be too costly. Advantages of this relatively new casting process are: very little or no pressure and heat are required; molds may be very simple and relatively inexpensive; no expensive molding presses or facilities are required; and, since the manual operations involved are elementary, relatively unskilled labor can be employed.

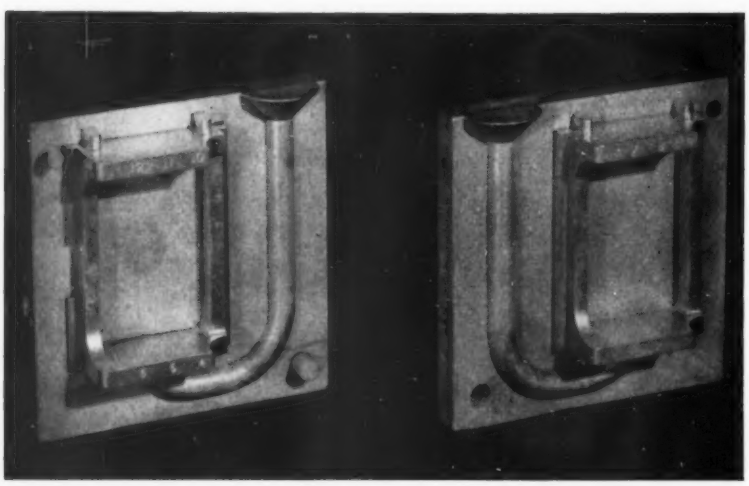


Fig. 1. Patterns made of cold-rolled steel are used for producing phenolic molds

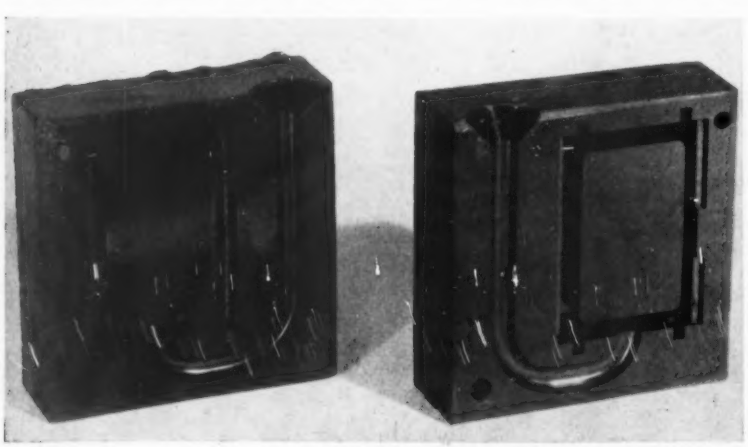


Fig. 2. Phenolic mold set which is produced from the cold-rolled steel pattern above

Problems Encountered

The nature of the styrene polyester casting resins used at Kearny presented several problems, one of which was the development of low cost molds meeting certain requirements. The molds should not be distorted by the shrinkage (approximately 7 per cent by volume) of the cast plastic mass nor by any clamping required to close the mold. The surface should not deteriorate or be attacked by the resin and should remain smooth for a reasonable length of time. The mold must be physically stable, so that normal dimensional tolerances may be held. And, the molds should be rugged enough to withstand normal handling and cleaning, yet be inexpensive enough to be expendable — a requirement, perhaps, for low volume production.

In general, mold making falls into these groups or combinations thereof:

1. The additive process, in which suitable materials are superimposed over a master "pattern" or prototype of the required molded part.
2. The subtractive process, in which all components of the molds are reduced by various machining operations.
3. The forming process, in which mold components are shaped from suitable materials to produce the desired form of mold cavity.

Today, molds made of phenolic

plastic compounds by the additive process are being used at the Western Electric Company's Kearny plant. The story of the evolution of these low cost molds is an interesting one. Wood molds and machined metal molds were initially tried but did not work out because of either short mold life or because of the expense of machining. Vinylite "skin" molds, plaster of paris, sprayed metal and low melting-point alloys and even casting resins themselves were tried with indifferent results. During further investigation some of the liquid casting resin was poured into phenolic cup-shaped parts and allowed to harden. It was found that the phenolic surfaces remained polished and apparently unattacked. Additional development work proved that the phenolic molds were highly satisfactory.

Cold-Rolled Steel Patterns

In producing these molds, by the additive process, patterns, Fig. 1, made of cold-rolled steel were found to be acceptable. With proper design consideration of shrinkage allowances, tapers and radii, patterns can be made which are low in cost and which can be used indefinitely to produce an unlimited number of molds.

The pattern is mounted on a plate in a chase or molding box on a conventional compression molding press and, using general purpose phenolic molding compounds, a procedure the same as that used in making any ordinary compression molded plastic part is followed in producing phenolic molds, Fig. 2. Such molds can be produced at a cost of under $5.00 per set. It is noteworthy that at least ten times more parts per mold are now being produced with phenolic molds than was possible with other molds which cost 10 times more.

Comparison of Costs

Figure 3 presents a comparison of the estimated total cost per part (labor, material and amortized tooling) for three parts made by conventional compression molding and by this casting process. The average tool cost for the high pressure molding method is seen to be approximately five times that for the casting method.

In each case the total cost per part is less for the cast resin until a point is reached where the annual requirements have increased sufficiently to make amortization of conventional molding tool costs over four years production a small factor. It is obvious, therefore, that with relatively low part requirements, the key to the successful use of casting resins is in the use of low cost tooling.

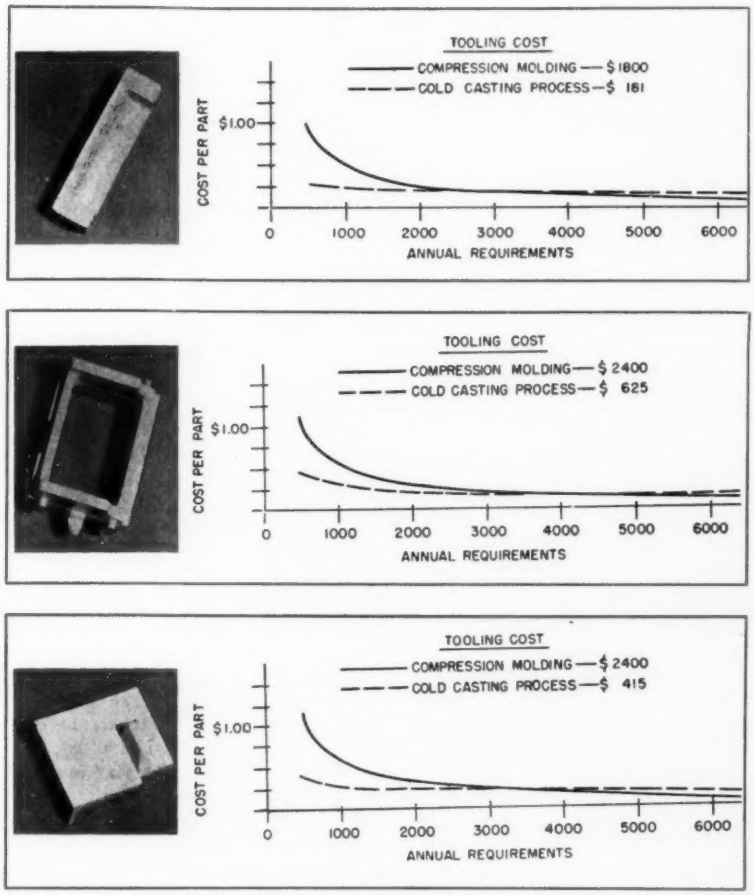


Fig. 3. Comparison of estimated total cost per part—labor, material and amortized tooling—of three of the parts pictured beside the charts. Comparison is made between conventional compression molding and the low-cost casting process

Fig. 4. Several parts, from simple to intricate, produced by low-cost molding

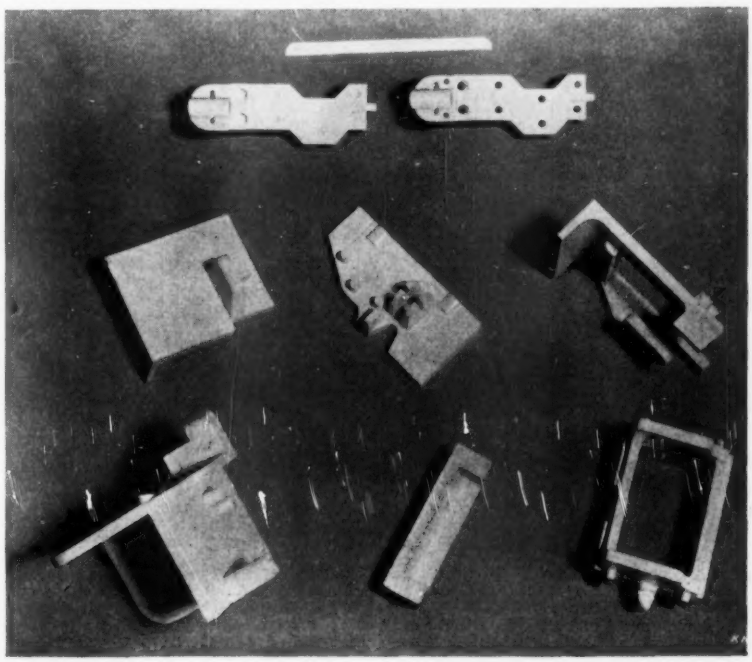


Fig. 1. Five pipe lines, running from Fort Mifflin to the Philadelphia Refinery, are in position just prior to being pulled across the Schuylkill River

Pipe Line "Swims" Across River

Running a pipe line over land is not too difficult a job, but moving that same pipeline across a river certainly presents a problem . . . Atlantic Refining Co., faced with this problem, solved it by having pipe line "swim" across river

RUNNING A PIPE LINE from the Ballast Wharf field at Point Breeze to a point near the Wax Wharf in the North Yard of the Philadelphia Refinery of the Atlantic Refining Co. isn't as simple as it might sound. There's a little matter of the Schuylkill River that complicates the operation.

But, having performed a similar feat in 1938, the Engineering & Construction Department of the company did it again in a manner that made the whole river crossing operation look relatively easy. While the actual work was done by an outside constractor, the plan was E. & C.'s and the job was completed under the supervision of E. & C. personnel.

The line—or lines, for there are five of them—will carry crude oil from Fort Mifflin to the North Yard. The portion which crosses under the surface of the river is 720 ft long and lies in a trench dredged to a depth of 35 ft below mean low water.

The submerged length, protected with a hot doped and wrapped covering, was assembled and roll welded on the Ballast Wharf side on a temporary railroad tract, which acted as a welding table and later as a launching runway. Six-inch rollers were placed under the pipes for launching.

At a designated time, the river was cleared of all traffic at the point of crossing. The end of the piping was turned upwards at such an angle so that when it was pulled across the river, its ends protruded above water and rested on steel foundations to permit final tie-ins. A cable from a steam-driven winch near the Philadelphia Water Pump House was attached to the end of the pipe line for towing.

During the towing operation, two derrick barges were used. One of them lifted the front end of the lines, guiding them down into a previously dredged trench. The other was behind, in tandem fashion, keeping the dead weight of the lines off the bottom of the river and permitting an easier pull.

In addition, two tractors on the Ballast Wharf side of the crossing assisted in moving the piping as it went on its below-the-surface journey.

Once on the North Yard side of the river, the pipes, coming out of the water inside a specially built cofferdam, were connected to a system of elevated pipes that run into the refining area of Atlantic Refining Co.

Fig. 2. The two tractors shown above assisted in pulling the pipes across the river. Main pulling power came from a steam-driven winch in the North Yard. The portion which crosses under the surface of the river is 720 ft and lies in a trench dredged to a depth of 35 ft below mean low water. Submerged length protected by hot doped, wrapped covering

Fig. 3. This is a close-up view of the risers as guy cables were being attached. This portion of the pipes protruded above the surface of the water as it was pulled through the river to the other side

Fig. 4. The pipes, launched from a temporary railroad track runway (shown on opposite page), are lowered into the water to begin their below-the-water-surface journey across the Schuylkill River

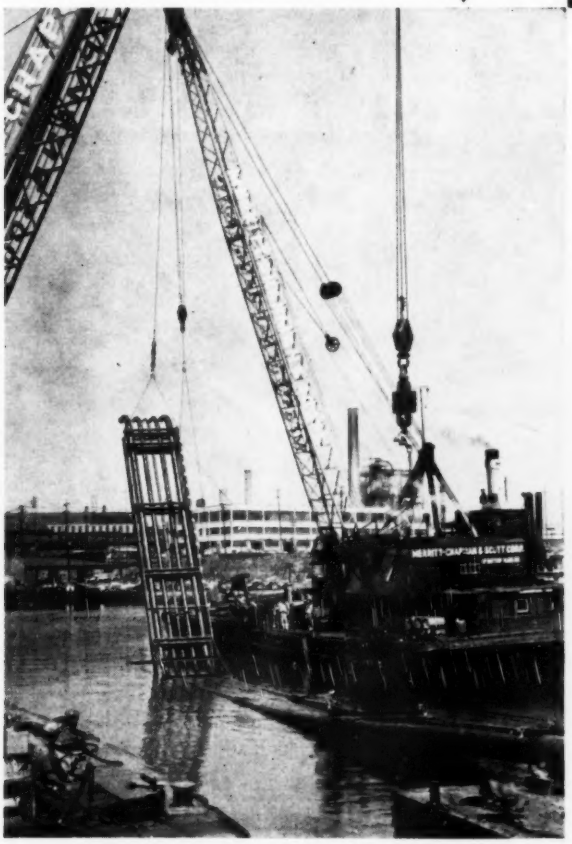
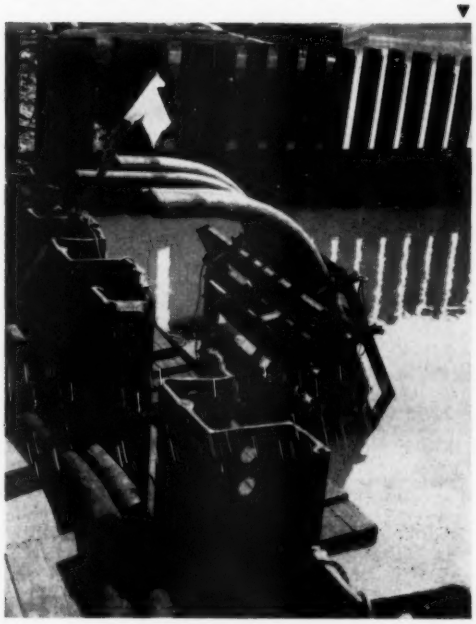


Fig. 5. Still farther out in the river, the lines are held in position by the first of two derrick barges as second one moves in to keep dead weight of lines off bottom of river permitting an easier pull

Fig. 6. Once on the North Yard side of river, the pipes, coming out of the water inside specially built cofferdam, were connected to elevated pipes that run into refining area—and the job is completed



Casting Foundation Bolt Holes

Two types of wooden boxes have been developed by the author in order to 1: Do away with the time wasting practice of breaking up concrete floors to install machinery bolts 2: Make available re-usable boxes for pre-casting

By F. E. RILEY, Mechanical Engineer

WHEN LAYING NEW concrete floors on which machinery has to be secured it is a good practice to cast holes in the new concrete rather than to break these through after the floor has set hard. A standard method of doing this job is to make ordinary square wooden boxes and to position these before pouring the concrete. When the concrete has set, the boxes form a wooden lining to the hole and have to be removed by chipping away the wood. The practice is wasteful since the wooden box is destroyed and cannot be used again; also, the time taken to chip away the box and reduce it to slivers is long.

To avoid the expense of making wooden boxes and the labor of destroying them, two methods of pre-casting holes in floors have been evolved by the writer. In Fig. 1 is shown a re-usable box, or form, for bolt holes which is of square section but which tapers throughout its length. In the example illustrated, the box has a total length of 12 in. and is 3 in. square on the outside at the top end, tapering to 2 in. square at the bottom. The box is a weldment of ¼ in. mild steel plate and for this purpose, the edges are bevelled before assembly to provide a fillet of weld metal for joining the pieces together. The outside surface of the box is rough ground after welding to remove any protruding bits of weld metal and to ensure a reasonably smooth exterior.

Controlling Depth

About 2 in. of the box length stands above the floor line when in use so that the maximum effective depth of the hole cast in the concrete is about 10 in. For shallower holes in thinner floors, the depth can be controlled by setting the box to the desired hole penetration.

Each box has holes drilled through two opposite sides, near the top, for accommodation of a pin which may be inserted therein for attachment of the extracting link or puller. The puller comprises a short piece of steel tubing with a steel strap bent around it and welded thereto. The downward projecting ends of the steel strap are drilled for engagement with the aforementioned pin.

In the interest of convenience and for the prevention of accidents arising from make-shift levers, the lever stand is provided and comprises a square piece of ½ in. thick mild steel plate on the upper surface of which are welded a pair of uprights. The top ends of the uprights are drilled horizontally for a pin which intersects a bar passing between them.

When the concrete has set hard, the steel box can be pulled out of the hole in a vertical direction by engaging the end of the bar with the puller and pushing down on the extended bar end. If the concrete is not more than 24 hours old, its grip on the steel box can be broken easily by hammering sideways on the end which projects above the floor surface. A quick jerk on the lever end will then lift the box out of the hole. The height of the lever stand can be adjusted conveniently to suit the amount of projection of the box by placing packing under base plate.

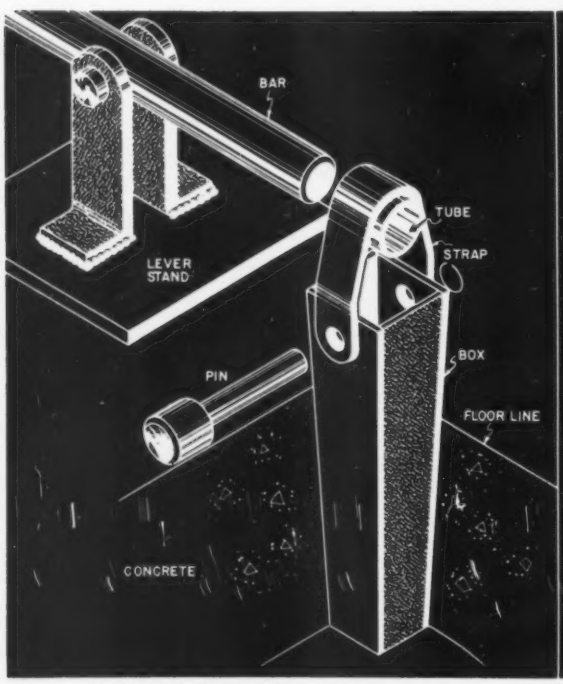


Fig. 1. Box for making tapered holes for machinery bolts

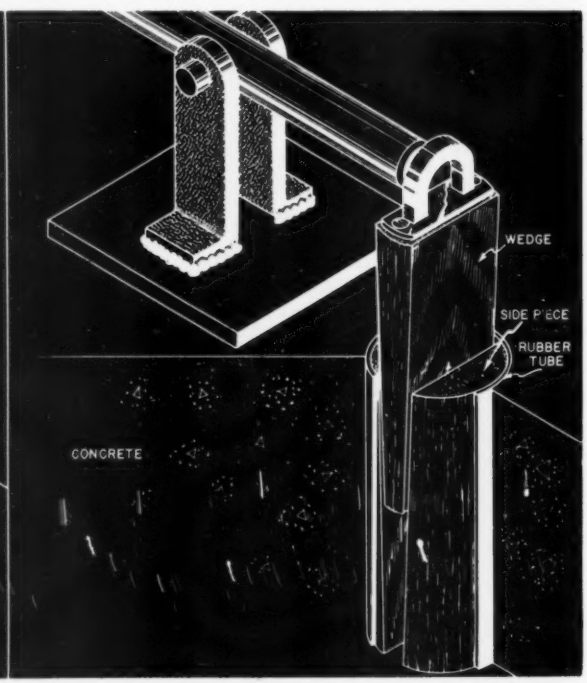


Fig. 2. Box for making bolt holes of cylindrical shape

A tapered hole is made by the box illustrated in Fig. 1 and while no trouble has been experienced through the foundation bolt grouting failing to unite solidly with the sides of the tapered hole, some prejudice against it has been difficult to surmount. Therefore, an alternative idea for the casting of parallel sided cylindrical holes has been evolved and is illustrated in Fig. 2.

This hole-former is inexpensive to make since it is principally of wooden construction. It can be made in any desired length or diameter and has a reasonably long life. The outside of the hole-former comprises a length of thin-walled rubber tube; bicycle inner tube and similar types of rubber have been found most suitable for this.

Core of the forming device is a wooden cylinder which has been sawed longitudinally to form three separate parts; a central wedge and two side pieces. The central wedge must be wider at the top than at the bottom and the two cuts must be made equally spaced either side of the cylinder. In the example illustrated, the cylinder is 4 in. diameter and the wedge at its widest end is 1½ in.

Removing Core

It will be apparent from Fig. 2 that if the wedge is extracted vertically, the two remaining pieces of the core will collapse toward one another and can be lifted easily out of the hole. The starting point, when making this device, is the bore diameter of the rubber tube available. With the core inserted in the tube and the wedge pushed home, the rubber should be stretched slightly so that it tends to hold the form of a rough cylinder which will withstand considerable rough handling. The cylinder will be roughly shaped because if a solid cylindrical core is started with and is then sawed longitudinally, the material removed by the saw will have caused the reassembled cylinder to be non-circular in section.

If the thinnest possible bandsaw blade is used for cutting, the shape of the finally assembled cylinder will have minimum distortion which can be ignored for all practical purposes. Of course, a broad saw blade will produce a large gap which can be filled by inserting strips of sheet metal between the wedge sides and the side pieces.

If the metal strip is the same width as the saw cut, the assembled former will once more be truly cylindrical. It is better practice to fasten the metal make-up strips to the wedge by means of countersunk head wood screws, rather than to have loose pieces lying around, in danger of being lost.

Advantages of the rubber sheathing

(Continued on page 170)

Color Code for GRINDING WHEELS

Here's a simple little trick of color-coding grinding wheels for safe practice . . . Like all good ideas it has had several excellent by-products . . . Increased interest in safety, and a considerably improved safety record are two of them

By H. MARSHALL SOARS, Plant Engineer
Sprout, Waldron & Company, Inc.

THIS SIMPLE COLOR SAFETY system developed by Sprout, Waldron & Company, Inc., Muncy, Pennsylvania, has materially reduced possible hazardous accidents involving portable grinders. The system, which involves painting grinding wheels and grinders certain colors in relation to their rated speed in rpm, was put into effect some years ago after a tragic accident.

At that time, the wheel on a portable grinder exploded causing a serious eye injury to the workman using the tool. After investigation of the accident it was found that the fault lay in an improper matching of a high-speed grinder with a grinding wheel rated for a much lower speed; this accident occurred although both were properly marked.

Since Sprout-Waldron, as manufacturers of a vast line of bulk material handling equipment as well as special processing machinery, had more than one portable grinder for every three employees in the shop, and since these grinders were, of necessity, of several different rated speeds, there had to be some type of system set up to insure proper matching of the grinding wheels and the portable grinders.

(Please turn page)

Fig. 1. Color-coding incoming grinder wheels in the storeroom prior to stocking. All wheels are painted a certain color corresponding to the maximum safe speed in rpm. Plant Engineer Soars, author of this article, is at right

Fig. 2. Rough-grinding of screw conveyor in the Sprout-Waldron plant. Both grinder and grinding wheel are painted with matching colors to insure against an accident-promoting mis-mating of low speed wheel with high-speed grinder

Right after the accident, the plant maintenance group under the plant engineer, the personnel department, the safety supervisor, and management held a conference to decide on some method of preventing future accidents of this sort. From that conference came a simple color system plus a safety program which has resulted, to date, in complete elimination of accidents.

A safety color was assigned to each grinding speed. For example, red was assigned to grinders and grinding wheels that would be safely operated at 20,000 rpm. Yellow was assigned to 18,000 rpm; blue to 16,000 rpm; black to 14,000 rpm; and green to 12,000 rpm.

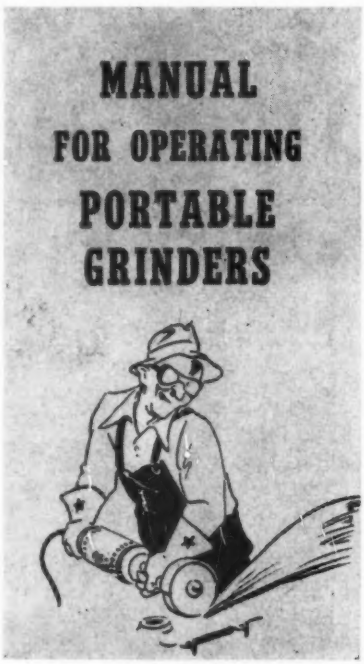
All grinders in the shop and in the storeroom were painted the appropriate color for their rated speed. In addition, all existing wheels were given one coat on one side of the wheel of a standard color. The storeroom uses an enamel which quick-dries, has brilliant colors, and a good thick coat. An important sidelight of this safety color system was the fact that the paint on the grinding wheel made quite visible those minute cracks and breaks which appeared in the surface of the wheel due to rough handling in transit. Thus, inspection of new wheels became easier and more efficient.

To supplement the program, a little pamphlet entitled, "Manual for Operating Portable Grinders" was prepared and one copy of this was given to every employee in the shop. In addition, as new men are hired, they are also given a copy. This pamphlet is a handy 3 in. by 5½ in.

The most important data contained in the pamphlet was the table which gave the grinding speeds as well as the safety color. In addition, some of the text explains that grinders had been painted to identify their speed. "For example," the pamphlet states, "red grinders take red wheels only; yellow grinders take red and yellow wheels only; blue grinders take red, yellow and blue wheels only, etc."

In addition, the little pamphlet gives a list of good grinding practices. One page of it is entitled, "Do's." They are as follows: 1. Test all wheels for cracks before mounting. 2. Use blotters between flanges and wheel when mounting. 3. Be sure wheel is straight on spindle before tightening nut. 4. Run all wheels after mounting for at least 1-1½ minutes before grinding. 5. Use wheel guards wherever possible. 6. Check wheel if grinder is dropped. 7. Return grinder to foreman as soon as you are finished grinding. 8. Always wear safety glasses when using grinders of any kind, anywhere.

Fig. 3. Reproduction of cover of little safety pamphlet issued to employees. Booklet has been distributed widely in East by abrasive wheel manufacturers



Just as important, was a list of "Don'ts": 1. Don't mount two wheels on one grinder. 2. Don't use excessive pressure when mounting wheel. 3. Tighten nut only enough to hold wheel firmly. Don't use a wheel that is more than twice the diameter of the flange. 4. Don't use pressure to stop grinder. 5. Don't lay grinder down until completely stopped. 6. Don't use side pressure on any wheel. 7. Don't use a grinding wheel that has a rated speed less than the speed of the grinder. 8. Don't use a wheel that has not been painted a safety color.

This safety program was brought to the attention of all foremen and they were instructed to watch out for violations of the "Do's" and "Don'ts," as well as to be on the alert for mismatching of color of wheel and grinder. The color code made it easy to check. The employees were alerted to the steps that had been taken to protect them and they cooperated.

The little pamphlet, which is not copyrighted, has been distributed quite widely in the East by the grinding wheel manufacturers. Sprout-Waldron has been told that the system has been adopted in several other plants.

Those in attendance at the February 9 meeting were: Standing, left to right: H. W. Shaffer, Sears, Roebuck and Co.; P. J. Anderson, Colgate-Palmolive Co.; H. D. Ege, Westinghouse Electric Corp. (temporary secretary); S. M. Bernhardt, Ford Motor Co., Aircraft Div.; G. W. Larson, Standard Oil Co.; S. Szczygiel, U. S. Gypsum Co.; L. L. Robinett, American Telephone and Telegraph Co.; M. E. Drake, Procter and Gamble Mfg. Co.; E. G. Lindquist, Fairbanks, Morse & Co. Seated, left to right: J. W. Burke, Ford Motor Co., Aircraft Div.; W. F. Koste, Chevrolet Motor Division; Rocky Marinello, Plant Engineering magazine; R. S. Grant, Owens-Corning Fiberglas Corp.; C. W. Simpson, Nelson Art Gallery; E. G. Applegate, Bendix Aviation Corp. (temporary chairman); J. L. Daly, Butler Mfg. Co.; G. E. Wills, Muehlebach Brewing Co.; M. W. Coble, Gustin-Bacon Mfg. Co. Seated, right foreground, left to right: H. R. Lamborn, Phillips Petroleum Co.; W. E. Renz, Fisher Body Div.; W. D. Myers, Kansas City, Mo., engineer; and H. F. Toot, The Vendo Co.

Plant Engineers Organize Greater Kansas City PE Society

TWENTY-ONE plant engineers from the Greater Kansas City area attended the meeting on February 9 at the Wishbone Restaurant, to discuss the possible organization of a Plant Engineers' Club for that area.

This meeting was the result of a previous get-together of six plant engineers in January. Plant Engineers present at the January meeting were: E. G. Applegate, Bendix Aviation Corp.; H. D. Ege, Westinghouse Electric Corp.; R. S. Grant, Owens-Corning Fiberglas Corp.; E. G. Lindquist, Fairbanks, Morse & Co.; J. M. Newman, General Motors Corp.; and R. W. Stafford, Sheffield Steel Corp. They discussed the possibility of such an organization and laid plans for contacting other plant engineers in the area.

At this February meeting, following the dinner, each man introduced himself and gave a brief resume of his background in plant engineering. It was apparent from the general discussion that each man would benefit from the exchange of ideas of such an organization.

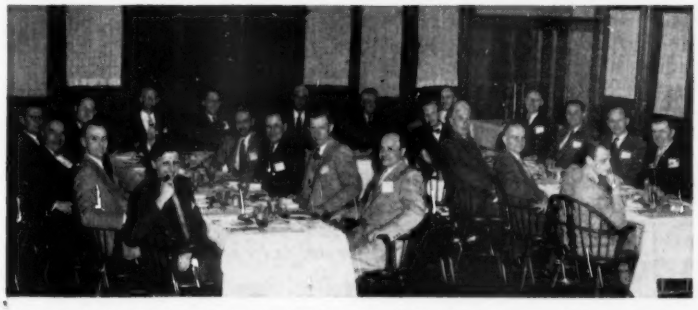
Following the introduction, E. G. Applegate, was nominated temporary chairman and H. D. Ege, temporary secretary.

R. S. Grant, Owens-Corning Fiberglas Corp., was appointed chairman of the Rules Committee. He will be assisted by P. J. Anderson, Colgate-Palmolive Co.; H. W. Shaffer, Sears, Roebuck & Co.; W. D. Myers, assistant city engineer; and J. W. Burke, Ford Motor Co., Aircraft Division.

J. L. Daly, Butler Mfg. Co., M. W. Coble, Gustin-Bacon Mfg. Co. and W. F. Koste, Chevrolet Motor Div., GM, were appointed to the Program Committee.

Future meetings of the group will be scheduled for the fourth Tuesday in the month.

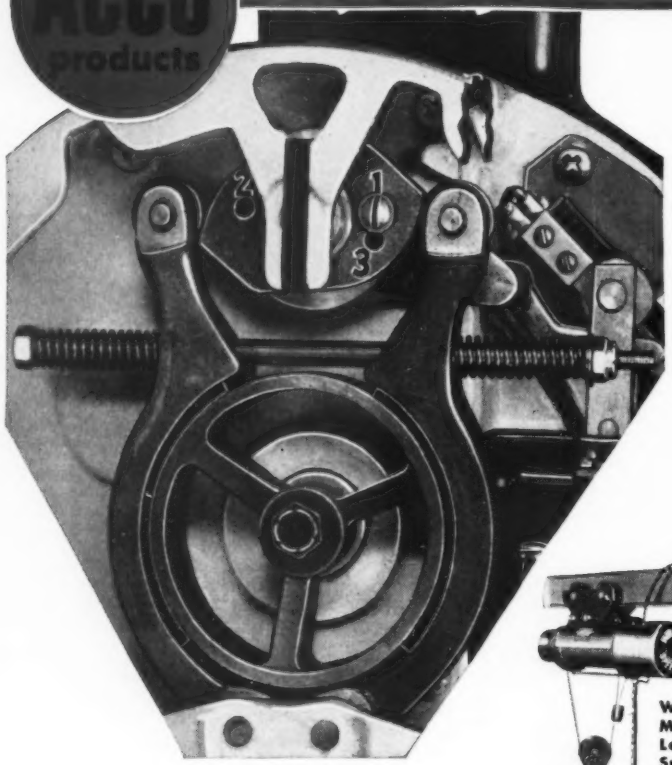
Dutch Maintenance Team Enjoys "Night Out"

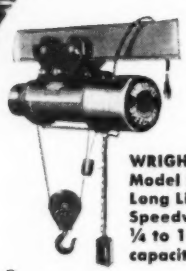


On a recent trip to the United States to study American maintenance procedures, the Dutch Maintenance Team relaxed from the busy schedule by spending an evening with members of the Greater Chicago area Plant Engineers' Societies and the editors and publisher of Plant Engineering

Wright Hoists (1954 Models)

ACCO products





WRIGHT Model L-1 Long Lift Speedway ¼ to 1-ton capacities

Nothing to adjust but the cam!

• The brake assembly pictured above for the WRIGHT FRAME 1 SPEEDWAY HOIST is your assurance of maximum hoist service... minimum down-time. Adjustment of this cam-actuated brake to compensate for brake lining wear is literally "as simple as ABC." *There is no guess work about it.*

When the load hook starts to drift, remove the screw shown at position No. 1 (*see picture*), swing the cam around so that position No. 2 is in line, and replace the screw that secures the cam to the solenoid lever arm. For the final one-third of brake lining wear, set the cam at position No. 3. This repositioning of the cam is the ONLY adjustment to be made by the users of WRIGHT Hoists. The brake springs and solenoid are factory-set... NEVER need adjustment for brake lining wear.

Long life is a built-in characteristic of these hoists. They are built and guaranteed for service to the limit of the duty cycle of 30 minute, totally enclosed NEMA specification motors. These 1954 models provide full accessibility of parts for lowest maintenance costs. To get at the brake and controller, you remove two screws which hold the end cover. To get at the limit switch, transformer, and solenoid coil, you remove three screws and the side cover comes off. With this full accessibility you can make a brake adjustment or replace electrical parts in a matter of minutes.

Remember, PRICE + MAINTENANCE = COST. For full details on the low-cost WRIGHT Frame 1 Hoists see your WRIGHT distributor or write our York, Pa., office for literature.

ACCO

Wright Hoist Division

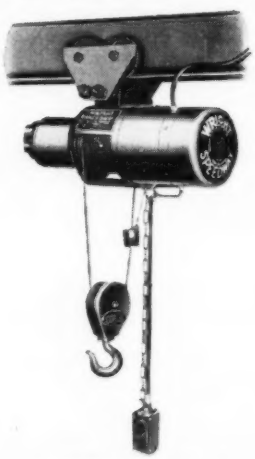
AMERICAN CHAIN & CABLE

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

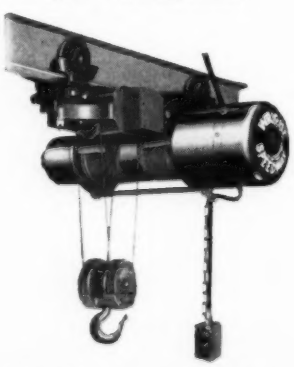
Hoists Trolleys Cranes

IMPORTANT
Maintenance Features

1. **LONG LIFE**
2. **SERVICE ACCESSIBILITY**
   End and side covers quickly removed for complete accessibility of brake, controller, solenoid, limit switch, transformer
3. **SOLENOID ASSEMBLY**
   never needs adjustment, designed to compensate automatically for brake wear
4. **BRAKES**
   require only two pre-determined field settings...no guess work
5. **FRAMES**
   Strong, ductile
6. **GEARS**
   Alloy steel
7. **MOTORS**
   NEMA specifications

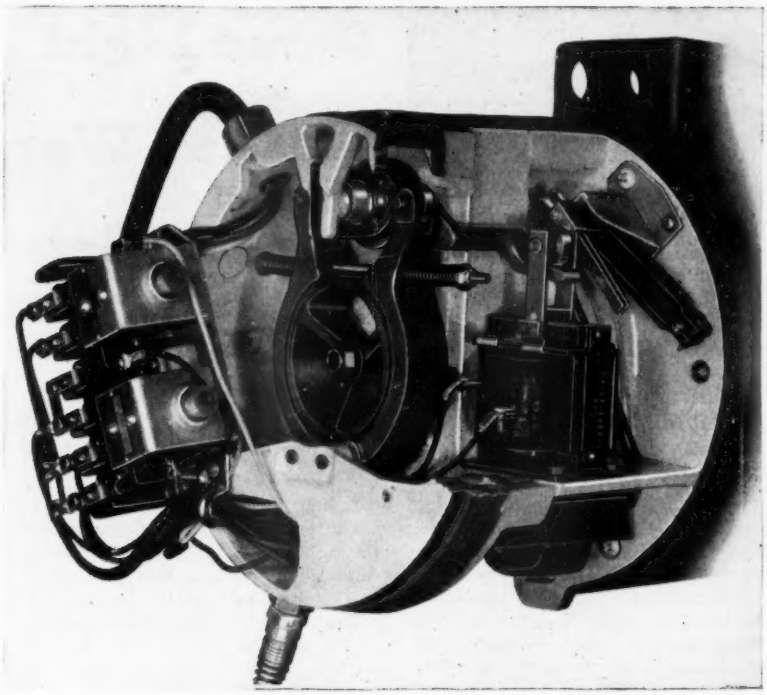


WRIGHT Frame 1 Parallel-mounted Speedway
¼ to 1-ton capacities



WRIGHT Model WH-1 Close Headroom Speedway
¼ to 1-ton capacities

Smash Maintenance Costs!



This partly cut-away illustration (with controller swung out of position) shows the full accessibility of parts provided in the 1954 models of WRIGHT *Frame 1 Speedway Hoists. Note the simple, rugged design of brake and solenoid assembly.*

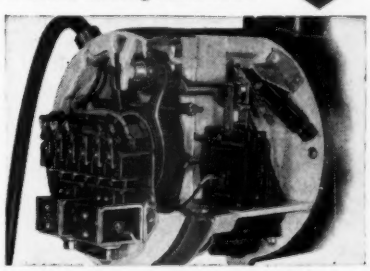
Here's Why Wright Hoists Are Lowest in Maintenance Cost

• The operating heart of an electric hoist is the solenoid-actuated brake assembly. The brake is automatically applied by springs unless the hoist is running. Then the force of the energized solenoid coil overcomes the spring pressure and releases the brake. Here's where trouble begins with ordinary hoists ...keeping the delicate balance between brake spring pressure and solenoid coil pull. But you can't have this trouble with a WRIGHT Frame 1 Hoist because there is no manual adjustment of the solenoid coil...*it's completely automatic!*

And there is no manual adjustment of brake spring tension. Each of the two life-long brake springs has a foolproof setting. The holding nut screws down to a shoulder, and then they're set for the life of the brake lining. Tension in the springs is automatically compensated for by the curvature of the brake cam. This precision cam provides uniform, balanced solenoid pull at *every* stage of brake wear...even after you reset cam at the pre-determined positions for additional brake lining service.

The brake needs adjustment only when the load hook starts to drift. There is *no guess work* in brake adjustment on these 1954 Model WRIGHT Speedway Hoists. It's just a matter of moving one screw into another precisely located hole in the cam. This is due to design of the double-acting brake cam which has three fixed...and numbered (1, 2, 3) ...settings or holes. Factory setting is in hole No. 1. When the load hook starts to drift, lining will be worn so you can reset cam screw in No. 2 position. The next setting of the cam is at No. 3 position. There is *no adjustment of brake springs* and *no adjustment of solenoid coil*. The great possibility of human error is eliminated, so down-time is reduced to an absolute minimum.

Controller back in operating position. Note that brake cam can be reset without moving controller.



The WRIGHT Frame 1 Speedway Hoists were designed to save you maintenance costs. You can prove their full accessibility and low cost maintenance if you place one or more on comparison test in your shop with any other type of hoist. Try a 1954 Model Frame 1. Put it to work. Let it prove itself on your job.

Your WRIGHT HOIST distributor will gladly give you further details. See him at once or write us for information.

REMEMBER: Purchase Price + Maintenance = TOTAL COST

For more facts circle 566 on Reply Card

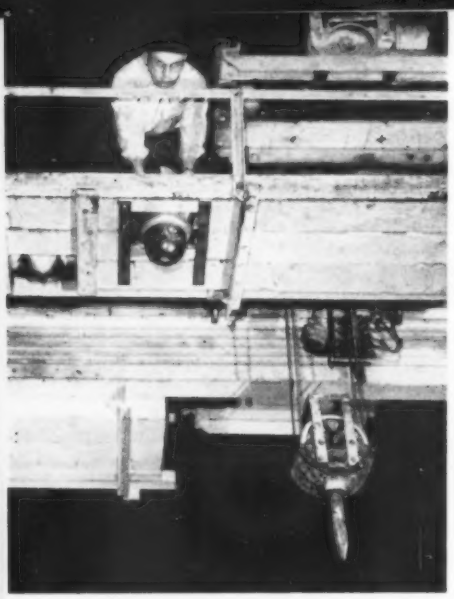


Fig. 1. Dome light when installed protrudes from underside of crane catwalk

Dome Light Flashes Warning "Crane Being Repaired"

By FOSTER C. KOEHN, Director of Plant Engineering, The Falk Corporation, Milwaukee, Wisconsin

WHEN EMPLOYEES at Falk Corp. see an emergency light flashing on one of the overhead cranes, they know that someone is working on the crane.

The company has found this to be the most successful means of warning employees that a maintenance worker is working either above the cab of the crane, on the adjacent runway, or on the crane bridge itself.

Other methods used with varying degrees of success were torpedo caps placed on crane rails (both sides of runway), rail blocks and signal flags. By far, the most desirable method is the complete lock-out of electrical power to crane, but this is usually possible only when production personnel are not working and at times, not even then.

We experimented with a red flasher light of the type used on various emergency vehicles, such as patrol cars and ambulances.

Our first installation was made with the light placed in the crane control cab. We discovered that the corner post construction of the cab tended to shield and hinder the effectiveness of the rotating flasher. We changed the location of the light to the center of the bridge where it was mounted underneath the crane runway or catwalk.

Since this location has proven satisfactory, we are installing the lights at this location on all other cranes with one change. The light has been inverted for better visibility from below as well as from all sides.

Power Source for Dome Lights

Consideration of a power source for lights also raised a question, but after eliminating the crane's power supply by complete lock-out, there was but one alternative, the use of an automobile type, wet cell battery.

These batteries will operate from eight to ten hours before recharging is necessary. This time allotment is much more than the average maintenance job takes; and when the light is not operating, a trickle charger replenishes the battery's power.

We have mounted one flasher light into each overhead crane throughout the plant, with exceptions only where there is one crane on a runway. In such instances, power is completely shut off and locked-out. Our program has included 41 to 46 cranes, which reach into three plant divisions: foundry, machine and weld shops.

Particular attention was given to proper mounting of lights, because various shops have different conditions in vibration, especially with cranes in motion. Where vibration was most prevalent the platforms are spring-mounted.

A simple hinged cover is installed over each removable platform to facilitate any light maintenance, such as dome glass, bulb or miscellaneous replacements and cleaning. The hinged cover protects openings that might otherwise be exposed.

By the continual flashing of light, personnel working at ground level receive an additional warning that there is work being done above, even though the immediate area below is isolated with usual barricades and warning signs.

The entire plant-wide project has cost approximately $6,000, bringing the average per crane to $125. Needless to say, the entire expenditure is not great as a guard against accidents.

Fig. 2. Unit can be easily removed for making necessary repairs or cleaning

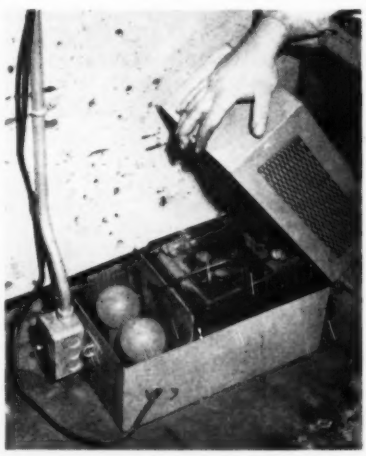


Fig. 3. Light bulbs in battery unit act as "trickle charger" across 220 v line

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2. They're strong — even when soaking wet.
3. They're so soft that many people use them as face cloths.
4. They're clean and white — of course.
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JUST ONE SCOTTISSUE TOWEL DOES THE JOB!

ScotTissue Towels have an exceptionally high fiber content. This "bulk," plus generous size and double fold, make a case of 3,750 ScotTissue Towels weigh 46 lbs.* Some paper towels cost less for 3,750 but are 10 to 20 lbs. lighter*— hence less drying power. Write for more facts. Scott Paper Company, Dept. PE-6, Chester, Pa.

*Shipping weight

SCOTTISSUE **TOWELS**

Symbol of the right kind of washroom

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Fig. 1. Cross-section view shows the crescent-shaped section at the bottom of the steam traced piping. The new tubing is extruded as a single unit

BUILT-IN STEAM TRACING at Low Cost

Piping users who handle sluggish chemicals will find this built-in tracing line a time-saver, material-saver and welcome money-saver

USERS OF STEAM traced piping have a totally new solution to their equipment problem in "Unitrace," a new integrally extruded steam traced aluminum pipe.

Piping users who handle sluggish chemicals such as tar and pitch or tricky solutions such as ammonium nitrate need heated lines to prevent their products from solidfying or crystallizing in the line. In contrast to normal methods of heating lines by using an external steam jacket or steam tube to apply the necessary heat, Unitrace is so produced that the steam line is an integral part of the pipe.

Extruded as a single unit from aluminum alloy, the new product is slightly oval in cross section because of the crescent-shaped steam passage adjacent to the product line. The size now available has the pipe dimensions of 2 in., Schedule 40 pipe.

In the first installation, Unitrace resulted in the following savings over conventional 2 in. steam jacketed lines: 38 cents a foot saved on material; 5 cents a foot saved on insulation; and 30 per cent reduction in labor costs.

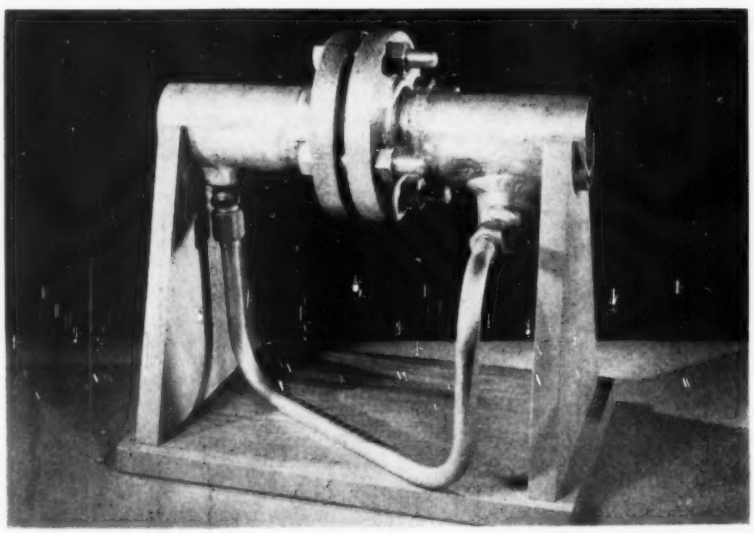
It exhibits greatly improved heat transfer properties over normal steam tracing techniques. The expense of steam jacketing and its installation is eliminated.

Pre-formed insulation will fit Unitrace. In the case of the 2 in. pipe, the new product is designed so that insulation for 2½ in. standard pipe will form naturally. When insulation is used, a smaller size can be used than with the older steam-jacketed piping. But because of improved efficiency, thermal insulation will be unnecessary in many cases, particularly where set quantities of process steam are allocated for tracing purposes.

For More Information

If you would like additional information about Alcoa's "Unitrace" write The Editor, Plant Engineering, 110 South Dearborn St., Chicago 3, Illinois.

Fig. 2. Section of tubing shows possible method of joining sections. Steam line at joint has been welded shut; welding fittings have been installed. Jumper is used to carry steam across the joint. This technique would be most valuable where joint is subject to periodic removal for cleaning or for relocation



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There are, as you know, new NEMA Standards for electric motors ... more power in less space.
When you look for a new NEMA frame motor, look for the one that is built on a solid foundation ... it carries the Fairbanks-Morse Seal of Quality.
The Standards are new .. But the Idea Is Not
Like the recent Fairbanks-Morse developments in other lines, the new F-M motor is the result of a basic engineering philosophy: More Performance in Less Space—a 120-year tradition at Fairbanks-Morse. Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois
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NEW LOCOMOTIVE DESIGN
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There's No Room for Dust at A. O. Smith's New Electrode Plant

A. O. Smith's new plant near Lancaster, Pa., was designed to provide ideal manufacturing conditions for the production of welding electrodes . . . So, dust is "off-limits"

By J. A. LOFTE, Consulting Engineer, Lofte & Fredericksen

WHEN A. O. Smith Corp. decided to build its electrode plant at Leola, Pennsylvania, for producing coated welding rods, it incorporated features learned from long experience at the Milwaukee plant as desirable in this type of manufacturing operation.

High on the list of such features were those connected with the heating, ventilating and air conditioning of the plant.

One of the problems in preparing coatings to meet required formulas is that of mixing the various ingredients to the exact proportion necessary. Many of the ingredients are minerals and are not hygroscopic, while others are cellulosic and very hygroscopic.

With changes in humidity, the mineral substances could be weighed with accuracy while the weight of the cellulosic substances would vary, depending on their moisture content. For this reason it was important that the humidity be controlled in the materials storage room to provide a uniform moisture content in the cellulosic materials before they arrive at the mixing room scales.

It was found more practical to thus control moisture content than to dry the materials in a dryer. An air conditioning system was installed in the mixing room to maintain year-'round constant temperature and humidity conditions.

In the mixing room the problem was primarily one of ventilation to remove dusts created by operations there and to prevent these dusts from seeping out into the manufacturing and storage areas.

In the manufacturing area of the plant the primary problem was that of controlling temperature.

The plant, except for offices, is windowless and is constructed to house two large conveyor type ovens. With the heat from the electrode baking ovens and other heat producing equipment, the temperatures within the manufacturing area would build up to an intolerable degree without an adequate ventilation system. Since the plant is windowless, and since it was desirable to provide uniformly comfortable working conditions for the employees, it was necessary to install a mechanical supply of air and a mechanical exhaust air system.

As finally installed, the various areas in the plant were handled as follows:

The offices and locker room were heated by means of a forced circulation hot water heating system in two sepa-

Fig. 1. Workman weighs out part of the dry mix. The meticulous weighing and measuring of materials is important in manufacture of electrode coatings. Ventilation helps remove dust created by operations and prevents dust from seeping into any of the manufacturing and storage areas

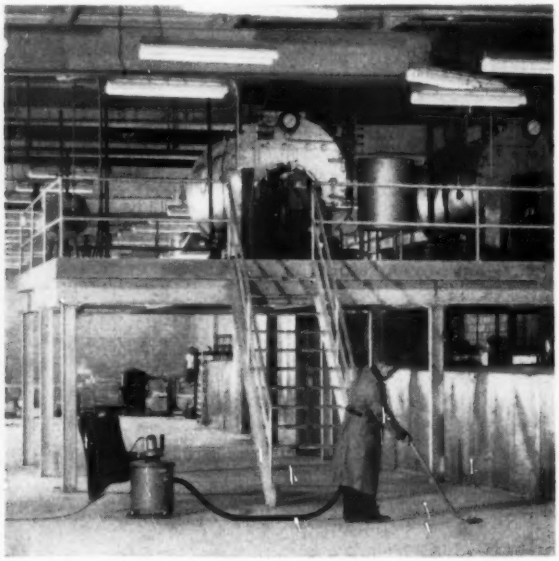

Fig. 2. To keep a dirt-free plant as clean as possible, the entire 41,000 sq ft floor area is vacuumed every 24 hours. Tile wall surfaces minimize dirt adherence and fixtures are so positioned that the "scrubbing down" process is unimpeded any place. Cleanliness makes for good quality control

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. . . Where Space is Limited

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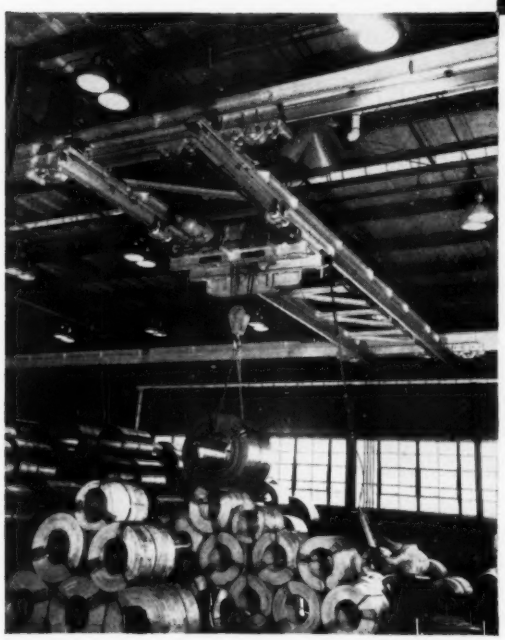

These are just a few reasons why American MonoRail Cranes are gaining in popularity and are being installed in increasing numbers of plants the country over. Call in your American MonoRail representative and have him tell you all the advantages of MonoRail Cranes such as—ease of handling—smooth travel—strength—safety interlocks—power operation and **interlocking carrier service between and beyond the craneways.** Consultation in connection with any handling problem is available without obligation.

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SAFE FOOTING—300 miniature squares per square foot—all of uniform height—provide maximum linear friction surface that protects you against lost time accidents.

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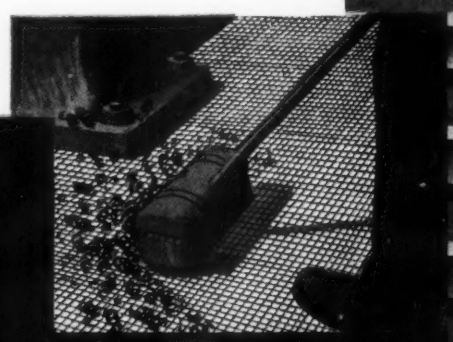

EASY CLEANING—Jal-Tread's straight line gutter pattern permits quick, thorough sweeping and draining in any direction.

ATTRACTIVE APPEARANCE—Jal-Tread's exclusive checkerboard pattern gives a distinctive, neat appearance in all its applications.

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rately controlled zones, with baseboard type radiation around the outside perimeter.

The laboratory and office lobby are heated by means of individually controlled force flow convectors.

Employee lockers are ventilated by an exhaust system arranged with ductwork below the lockers, drawing air through the lockers and finally discharging through a fan to the outdoors.

The materials storage room is completely air conditioned with a direct expansion system and one air conditioning unit, together with two steam type humidifiers located away from the air conditioning unit but within the room itself.

It was desirable to maintain a positive air pressure in this area to prevent the infiltration of outdoor air when materials were received and also to prevent dusty air from entering the room from the adjacent mixing room through a necessary conveyor opening in the separating partition.

To accomplish this, a static pressure regulator was installed to regulate the operation of the fresh and return air dampers on the air conditioning system so that pressure in the materials storage room is always maintained slightly above atmospheric pressure.

Roof Ventilator

In the mixing room a roof ventilator was installed to exhaust a constant quantity of air. This air was made up through conveyor openings in the partitions between the mixing room and the storage room, and between the mixing room and the manufacturing area. The amount of exhaust was determined by the size of these openings so that a minimum of air flow from the other rooms to the mixing room would be obtained at all times.

In the manufacturing area, three large blower type ventilating units are installed for necessary heating, to provide a minimum amount of outdoor air to make up for combustion air required for the ovens, and, when necessary, to introduce mechanically large volumes of outdoor air for temperature reduction within the plant.

Along with this, four large roof ventilators were installed over the ovens to remove heat as quickly as possible from the warmest areas. Here again a static pressure regulator was installed to maintain a positive pressure on this part of the plant.

The automatic control system was arranged to control room temperatures by means of a room thermostat to pilot the discharge air temperature controller which regulates an automatic steam valve supplying the coil in the supply air unit.

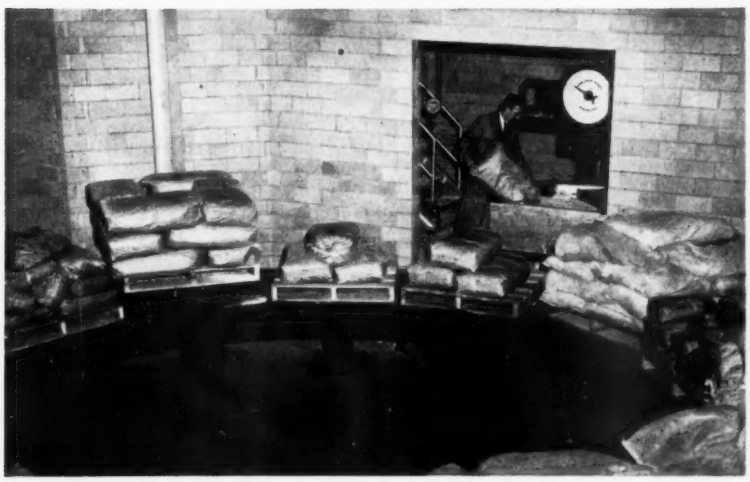


Fig. 3. Handling of the raw materials going into electrode coating mixes is greatly expedited by the use of a "Lazy Susan" turntable. Workman at dry mix weighing station (seen through door) selects what he needs from the revolving table. The device was designed and built by A. O. Smith Corp.'s engineers

Discharge air temperature, therefore, is varied to meet the demands of the room thermostat. The fresh and return air dampers on these units are regulated by means of a supersensitive static pressure regulator to maintain a slight positive pressure as compared with those for the outdoors.

The roof ventilators are equipped with motor-operated dampers. The position of these dampers is controlled by means of room thermostats set slightly higher than the room thermostats regulating the supply units. Controls function as follows:

Starting with the cold room, the room thermostats cause the steam valves to open to provide heat. As the room temperature approaches the setting of these thermostats, the steam valves modulate toward the closed position. As the baking ovens are put into use and provide a further heat gain, the temperature in the room rises above the setting of the thermostats controlling the supply air units, at which time the steam valve closes to a minimum position to maintain a predetermined minimum discharge air temperature.

Reverse Cycle

Upon a further rise in the room temperature the roof ventilators start, and as the temperature rises still further the dampers modulate to a wide-open position until they are exhausting 100 per cent of their capacity.

During this time, as the roof ventilators open to exhaust more and more air, the static pressure regulator senses the difference in the pressure between the room and the outdoors and automatically opens the fresh air dampers on the supply air units and closes the return air dampers to admit up to 100 per cent outdoor air.

If the ovens are shut off, and the temperature drops, the sequence is reversed with the automatic dampers in the roof ventilators going to a closed position, and the fans shutting off.

In addition to this there is an arrangement whereby warm air is taken off the ovens and, by means of a Y connection with the automatic dampers, this heated air can either be diverted into the manufacturing space or to the outdoors, depending upon the setting of another room thermostat. This latter arrangement was made to save fuel when the outdoor temperature was so low that the heat losses of the building would be greater than the heat gain within the building.

Steam is obtained through two packaged type steam generators which are mounted on a platform over the ovens to save floor space. These boilers are used not only for supplying steam to the ventilators and the air conditioning units, but also furnish steam to the ovens where the drying process requires the addition of moisture to regulate the rate of drying the electrodes. The steam boilers are shut off during off periods in the plant, which means that the ventilating systems are also cut off.

Liquefied petroleum gas is used for fuel.

Altogether, the system has been created to give adequate flexibility of temperature control in all areas of the building, to maintain humidities where necessary, to reduce the amount of dust in an inherently dusty operation, to provide adequate ventilation for the employees and adequate air for processes while at the same time keeping operating costs at a minimum.

←——For more facts circle 570 on Reply Card

Aircraft Plant Uses Magnetic Sweeper to Keep Metal Out of Jet Engines

To SAFEGUARD JET ENGINES against the potentially disastrous effects of small metal objects being sucked into air intakes, Grumman Aircraft Engineering Corp. uses a motorized road sweeper at its Bethpage, N. Y. plant. The sweeper incorporates a magnetic pick-up device containing a powerful 48-in. non-electric magnet.

Employed on runways and hangar areas, the mobile unit is equipped with rotary brushes which sweep debris into a hopper while the magnetic device, fixed at the rear of the unit by a special frame, picks up any nails, bolts, and other discarded ferrous objects which escape the brushes, capable of destroying both engine and plane.

The magnetic sweeper adapted to the cleaning apparatus was built by Eriez Manufacturing Co., Erie, Pa., and can be removed from the cleaner and pushed by hand or by lift truck, depending upon the scene of activity.

Portable Non-Destructive Testing Unit Sorts Metal "Twins" by Composition

FAST, ACCURATE AND NON-DESTRUCTIVE, an electric instrument for sorting mixed metal parts with varying alloy content has been developed by General Motors Research Laboratories. It is a portable service, known as the Thermoelectric Metal Comparator, and is designed to distinguish one part from another where composition is the only distinguishable feature.

The comparator can also detect chills in castings, and favorable results have been obtained using it to measure thickness of paint films and metallic platings.

In its tryout stage, the comparator proved its worth in one of the GM production divisions by sorting a stock of mixed steel. Steels of SAE 1112 and SAE 1117, varying in composition only 0.05 per cent in carbon content, were separated by the comparator.

When the probe is touched to a metal part, the comparator gives an immediate reading, that compares the part's composition with that of another, or standard part. Based on the operating principles of the thermocouple, the comparator circuit is a loop of two different metals, but the test part becomes part of the loop. When the probe tips touch the part being tested, the tips become the hot and cold junctions of the loop. Differences in metallic composition between test parts result in voltage changes that, when amplified, can be read directly on the instrument dial.

Hydraulic Test Laboratory Provides Field Conditions for Company Products

ONE OF THE MOST COMPLETE and flexible hydraulic test laboratories of its kind has recently been completed at Worthington Corporation's Harrison, N. J., works. Designed basically for production or performance testing, the hydraulic proving ground will also be a valuable tool for research and development of fluid handling machinery.

Facilities are capable of duplicating hydraulic fluid conditions for the more than 10,000 different types and sizes of pumps currently being produced, from fhp units to those pumping in excess of 100,000 gpm. It is also equipped for testing large centrifugal refrigeration equipment.

Several areas make up the lab—the standard test set up area, the large and special test set up areas, the high speed test area, and the power pump test area.

The standard area handles pumps not exceeding 2,000 gpm and 600 hp. Banks of underfloor venturi meters and instrumentation are observed and controlled from a central control room. The large and special areas feature power and steam facilities for testing pumps with capacities in excess of 100,000 gpm, and the high speed area has two Worthington steam turbines for driving high speed boiler feed pumps, centrifugal compressors and similar units.

STOP TRAMP IRON
with ERIEZ Magnetic Pulleys

Most Every Industry Uses ERIEZ Pulleys to REMOVE TRAMP IRON . . . Prevent Machinery Damage . . . STOP FIRES and Solve Product Purification Problems

THE redesigned patented line of ERIEZ *improved*—Permanent Pulleys makes available the most efficient, powerful and economical automatic installation for separating magnetic from non-magnetic materials conveyed on a belt.

With an ERIEZ Permanent Pulley you have no operating cost, no maintenance, no electric power required. ERIEZ Pulleys will perform, at top efficiency, under operating conditions of high or low temperatures and on wet or dry materials!

ERIEZ' complete line has a pulley for your exact need.

Extremely rugged construction, lined with powerful Alnico V, assures you the utmost in structural as well as magnetic strength.

Permanent Non-Electric ERIEZ Pulleys can never fail . . . electrical system failure will no longer endanger or stop your operation.

Top working efficiency is assured through belts of rubber, canvas, stainless steel or any other non-magnetic material.

Low installation cost . . . merely drop the shaft into the bearings and put on the caps.

Here's low cost, uninterrupted protection from tramp iron for costly crushers, grinders, pulverizers, stokers, etc.

Here's What Users Say . . .

ERIEZ installation at Fertl-Soil Company, Rahway, N. J., is removing 25 pounds of tramp iron from each ton of raw material processed!

"Operation without the ERIEZ Pulley would now be unthinkable," says James Smith of the Fertl-Soil Company. "Preventing machinery damage saves us about $1,000 annually, elimination of shutdowns saves another $3,000 a year, and man hours saved averages $1,200.

"We used mechanical separating devices in the past, but this ERIEZ Magnetic Pulley has proved to be by far the most positive and satisfactory means of eliminating tramp iron from our product."

The high degree of attraction o the magnetic pulley is shown in this operation where ramp metal is held firm until carried out of the magnetic field by the conveyor belt. The fertilizer being processed then drops into a mill for grinding and the ferrous contamination passes onto the chute back of the pulley. This installation assures protection to processing machinery and delivery of a clean finished product.

New Permanent Magnetic Super Sweeper Keeps Lots, Roadways, Factory Aisles, etc. Free of Dangerous Tramp Iron

Here's a streamlined, powerful magnetic sweeper designed to pick up and hold dangerous tramp iron from large areas, helps to keep areas clean and safe, reduces accidents, tire punctures, etc.!

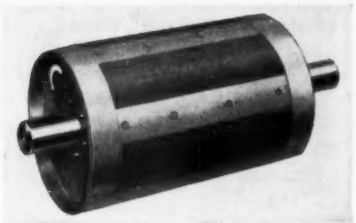
PUSH IT • PULL IT • SUSPEND IT!

Entirely new, fast cleaning principles make SUPER SWEEPER a natural for cleaning even the largest areas in a short time. It can be used by most everyone! Removes nails, etc. from parking lots, garages, warehouses and terminals . . . cleans factory floors of metal shavings, chips, etc. Removes tacks, staples, etc. from floors of manufacturers . . . ideal for foundries, contractors, platers, etc. Want more information—fill out and mail the handy coupon at right.

FOR INDOOR OR OUTDOOR USE . . .

Versatile in design, it can be used indoors or out . . . four sizes in three magnetic strengths for medium, heavy and extra-heavy duty tramp iron removal are available with all attachments for manual or mechanical operation. SUPER SWEEPER is quickly cleaned by turning magnetic face up with handle and stripping the metal accumulation from the sturdy neoprene cover. It has been designed for indoor or outdoor use . . . you can pull it, push it or suspend it!!!

For more facts circle 571 on Reply Card



New Patented *Improved* Designs Afford . . . Greater Protection Than Ever Before!

From ERIEZ, the pioneer and original producers of the permanent non-electric magnetic pulley, come redesigns and improvements which make the most efficient, versatile line of permanent magnetic pulleys available. Years of engineering, manufacturing experience and testing have gone into the new *improved* ERIEZ Magnetic Pulleys. 80 *improved* standard sizes with capacities from 50 to 18,600 cu. ft. per hour are available for prompt delivery . . . added to this any number of special widths and shafts are available to meet your exact requirements. For peak efficiency, dependability and power, install an *improved* ERIEZ patented Permanent Pulley.

Write for New, *Free* 2-Color Bulletins . . .

Fill out and clip the handy inquiry coupon below and we'll send you all available information on these products. Bulletin 501 is a six-pager packed with technical information, photos, dimensions, etc. on the entire pulley line. Bulletin 555 fully describes ERIEZ versatile new Magnetic Super Sweeper. Get your copy by return mail.

CLIP AND MAIL TODAY

ERIEZ MANUFACTURING COMPANY
71 D, MAGNET DRIVE • ERIE, PA.

Name .....

Title .....

Company .....

Street .....

City ..... State .....

Sales Offices throughout the United States

• *Please send me*

☐ PULLEY BULLETIN 501

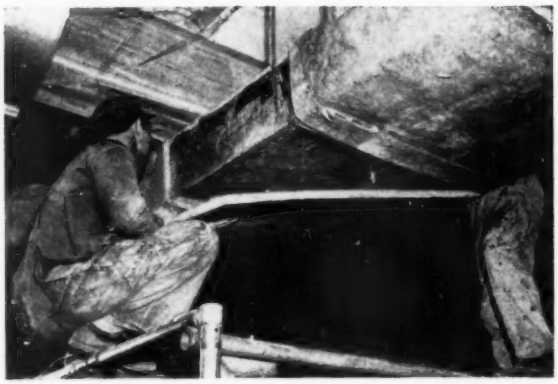
☐ SWEEPER BULLETIN 555

Insulation Cut from Rolls, Wrapped Around Ducts for Quick Installation

INSTALLATION TIME for insulating rectilinear heating and ventilating ducts has been substantially reduced by applying flexible felt insulation on heated and cold-air ducts in long rolls. The insulation can be applied either spirally or in fitted wrap-around sections.

The application of 1-in.-thick mineral fiber felt insulation on almost 10,000 sq ft of heating and ventilating ducts at the University of Toledo Library, Toledo, Ohio, successfully utilized the wrap-around method. The applicators were able to slide the material through small openings and around sharp corners of ducts rapidly and without damage. Since the width of the ducts varied from 2 to 4 ft, each length of insulation was individually cut from the roll.

Adhesive, spotted on the duct, anchors the felt as it is being applied. The ends of each length are tightly butted. Clips or insulation pins spaced along the underside of the ducts provide extra support for the insulation. Wire, wrapped around the entire circumference of the duct



and insulation, holds it in place permanently, and each joint is sealed with 4-in tape, or with staples or cord.

Drum "Up-ender"

THE PROBLEM of not only lifting and carrying drums, but also of tilting them to dump their contents into vats, has been solved by the design and manufacture, by Lewis Shephard, Watertown, Mass., of a new device—a drum "up-ender" attachment.

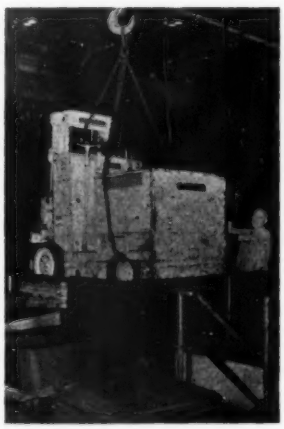
A hydraulically controlled pivot was attached to the modified fork arms of an electric truck which tilts the containers forward at an angle of 150 deg. All operations are controlled by the driver.

Lift Truck Lifted

WITH PRODUCTION SPACE limited at Perfection Stove Co., Cleveland, inactive die storage was relegated to the basement. Dies were handled by an 800-lb capacity Elwell-Parker truck.

To use the truck on both floors, with no ramps built between floors for truck travel, a bridge crane was put to work lowering the truck and dies through a floor well into basement.

When the truck has stored the dies in the basement, the crane lifts the truck to first floor.



Heavy-Duty Manipulator Tilts Outsize Equipment for Good Cleaning

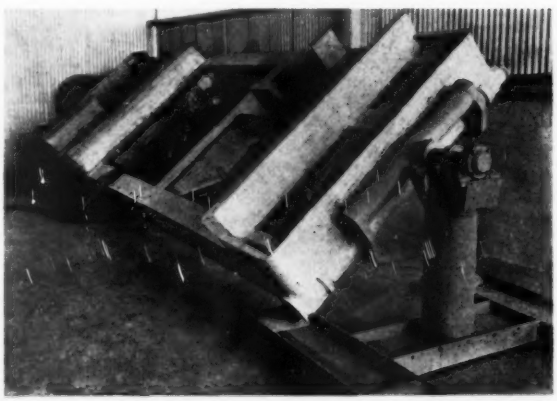
CLEANING AND PAINTING of large assemblies at the Torrance, Calif., plant of the National Supply Company are more easily completed, following the introduction of a new manipulator, designed for use with vacuum-blast cleaning and spray painting equipment.

The manipulator is built in two sections or end stands, each of which is mounted on four rollers for portability. This feature permits moving the fixture to the job, rather than the usual procedure of moving the job to the fixture, frequently a clumsy operation.

Fittings for holding workpieces of various shapes and sizes can be quickly attached to the manipulator bases. Construction of the manipulator permits rotation of most workpieces through 360 deg for full accessibility during cleaning and painting. An electric motor mounted on one of the end stands provides the power to rotate the workpieces.

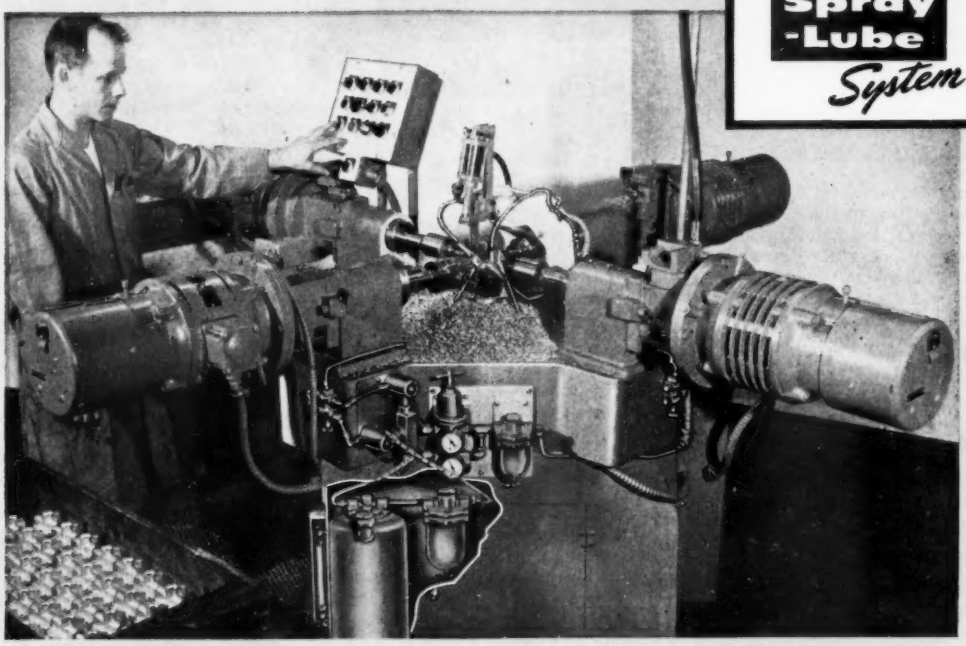
In addition to providing a more thorough cleaning job than was formerly possible with wire brushes and acid, the manipulator has aided in reducing cleaning painting time to 40 per cent of the time usually required.

The blast cleaning unit is a continuous cycle Vacu-Blaster, with a companion dust collector unit.



NOW a quick, low-cost way to "tool-up" for bigger production

NEW Norgren Spray-Lube System



gives more efficient application of cutting oils for

- *higher cutting speeds*
- *faster rate of feed*
- *longer tool life*
- *lower unit production costs*

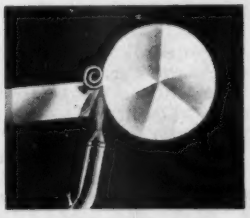
on tapping machines, drill presses, milling machines, grinders, lathes, boring machines, high-speed saws, stamping presses.

SEE IT AT THE ASTE SHOW

PIONEER AND LEADER IN OIL FOG LUBRICATION FOR 26 YEARS

• VALVES • FILTERS • HOSE ASSEMBLIES
• REGULATORS • LUBRICATORS

C. A. Norgren CO.
3443 So. Elati, Englewood, Colo.



Coolant where you need it... spray is applied to work area from any required direction to thoroughly lubricate critical areas of contact between cutting tool and work piece.

A Drop of Coolant

A Drop of Coolant SPRAYED

Fine spray rapidly dissipates heat...the spray lubricates tool more efficiently; has greater exposed oil surface area for fast, thorough dissipation of heat.

WRITE FOR COMPLETE DATA—NEW FOLDER No. 491

For more facts circle 572 on Reply Card

NEW PRODUCTS & PROCESSES

summarized for your convenience

Edited by M. E. Heniken

1—METAL PRIMER serves to stop action of rust

Ospho is a formula of orthophosphoric and dichromate with extenders and wetting agents. Orthophosphoric in various concentrations has long been used as a rust remover and bonding agent for paint on ferrous metals, manufacturer points out, and this new formula is one that can be applied over rust. After Ospho is applied and dry, rust action is stopped, it is claimed, and subsequent paint attaches itself so tightly that moisture and oxygen cannot attack the metal—the paint job lasting two or three times longer than otherwise.

Only preparation needed for Ospho is the brushing off of loose rust and scale. The new product is also reported in use as a primer on new ferrous metal. According to company, it imparts a slight etch to new metal, producing microscopic hooks to assure a gripping bond between paint and metal. Described as inexpensive, Ospho is available in 1-gal bottles, in 10-gal kegs and in 50-gal barrels. Rusticide Products Co.

2—SPRAY SYSTEM for cutting oils and compounds

Designed for more efficient utilization of cutting oils and drawing compounds so as to permit increased cutting feeds and speeds while prolonging tool life, the new Spray-Lube System offers many advantages. The spray can be applied to the work area from any required direction and to as many points as necessary. Also, the finely divided oil spray more efficiently lubricates the cutting tool, it is pointed out, reducing friction and its resulting heat. This fine spray also presents a greater exposed surface area of the oil particles, which, in turn, permits more rapid withdrawal of heat from the work area, says manufacturer, and this means reduced tool temperature and improved tool life.

The system provides individual metering control at each mixing valve, and

the fineness of the spray can be controlled by adjustments of air pressure and liquid pressure regulators. It is noted that smaller quantities of coolants or lubricants are required when using this application method. C. A. Norgren Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards on pages 37-38 and 187-188.

3—PORTABLE POWER SAW is rugged, self-contained

Intended particularly for heavy duty service, the Sawzall is a reciprocating type sawing tool designed to stand continuous use. It is described as compact, light in

weight and well balanced . . . maneuverable with one hand. Only 14½-in. long, the saw weighs just 6¾ lb. It has a ¾-in. stroke and operates at 2250 strokes per minute; it is reported to cut through wood, Transite, galvanized sheet, other metals, wire nails, Formica, Masonite and other materials.

A heavy-duty 110-v universal type motor powers the Sawzall. Complete with an introductory set of assorted saw blades and steel carrying case, it is priced at $84.50. Milwaukee Electric Tool Corp.

4—SWEEPER picks up metal from floor, bins, coolant

The Sweeperette, a rotary non-electric magnetic sweeper with a detachable magnetic electric element, can be used in a variety of maintenance jobs. When used as a hand-propelled rolling sweeper, its Alnico V magnetic tube is passed over small metal chips and filings, which rise to the rotating tube, spreading over its surface to a depth of ¾ in.

Unloading the 1-in. dia tube is done by removing it from the unit and clearing it of the accumulated metal with a neoprene wiper ring. A detachable collection pan, mounted at the base of the unit's handle, speeds the unloading process. Smooth-action neoprene wheels are designed for light handling even under a full load.

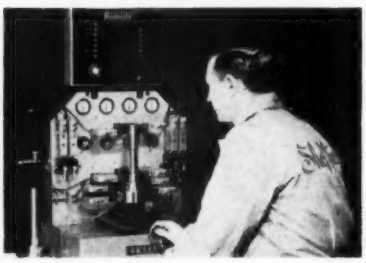
The magnetic element, when apart from the roller, can be used to retrieve fine ferrous material, as a skimmer or coolant cleaner, as an underwater recovery magnet or a magnetic collector in hard-to-get-at places. Priced as low as $34.50, Sweeperette comes in widths of 10-3/16 in. to 34-3/16 in., is claimed water and oil proof. The tube is stocked in lengths from 8 to 32 in. Eriez Mfg. Co.

5—MOUNTING PAD keeps operating machines level

Type T "Unisorb" is a new machinery mounting pad for machines which must remain level during operation. It is said to have greater firmness or density than previous models, tests having reported success on such precision machines as light and heavy lathes, grinders, milling machines, planers and jig borers. The material is available ⅜ in. thick and is said to carry a load of 75 to 125 lb per sq in. It is claimed to be completely resistant to petroleum products, mild acids and moisture conditions found in many plants. The Felters Co.

6—GAGE is designed to check 13 dimensions at once

A gage that inspects 13 dimensions simultaneously on a rear planetary carrier assembly indicates, by colored electric lights, whether the various dimensions are within tolerance, oversize or undersize. Parts can be inspected on the



Multichek at a rate of 600 or 800 per hour, says manufacturer. Dimensions checked include two locations on four outside diameters, the inside depth at four places and outside height of the base.

The operator merely places the part on the positioning fixture and slides it forward into gaging position. When all dimensions are within tolerance, the master light at the base of the light panel remains white and the 13 signal lights black out. However, if one or more dimensions are out of tolerance, the master light shows red and the individual signal lights show red for undersize dimensions or green for oversize. Lights of correct sizes black out. The Sheffield Corp.

7—PACKAGED BOILERS for oil, gas, combination firing

Formerly offered in smaller sizes and with a standard pressure-atomizing oil nozzle for firing light oil only, this company's Model 4 Powermaster Packaged Automatic Boilers are now available

SAFE CONTROL

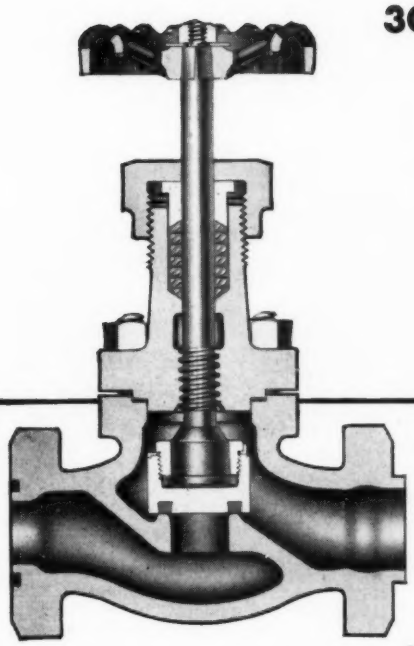
for ammonia and other hard-to-handle fluids

CRANE

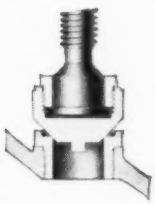
300-pound heavy-duty all-iron valves

Put these Crane valves to the test—use them for ammonia, air, oil, gas, caustic solutions, chlorinated compounds, alcohols —for chemicals and process work. Their rugged bodies of Ferrosteel (35% stronger than cast iron) . . . their precision seating designs . . . the unusually deep stuffing box and high-grade packing . . . the sweeping interior body contours . . . assure the safety and lasting service you want.

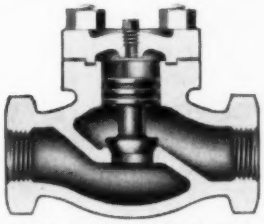
The line includes *bolted bonnet* globes and angles with choice of disc, *union bonnet* globes and angles with plug-type disc, lift checks, expansion valves, relief valves, liquid gauges —and all the fittings, flanges, return bends and other specialties for a complete Crane Quality installation. Check with your Crane man.



Cross-section bolted bonnet Globe, with flanged ends and special lead-faced disc. Sizes ¼ to 4-inch.



Bolted bonnet Globes also available with steel disc and seat where high temperatures or corrosion prohibit use of lead.



Cross-section, Lift Check with bolted cap, and cushioned disc action which increases valve life. Sizes ½ to 2-inch.

New 6-page folder AD1977 catalogs this complete Crane line. Write direct, or ask your Crane Representative.

THE BETTER QUALITY . . . BIGGER VALUE LINE . . . IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

For more facts circle 573 on Reply Card

NEW PRODUCTS

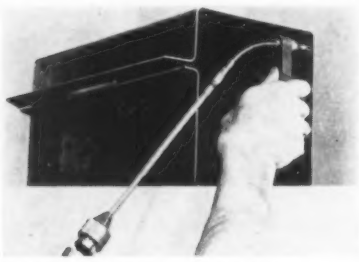
(Begins on page 130)

through 100 hp size. The line also includes models for light oil firing, gas firing, and combination gas or oil firing.

A three-pass boiler with a single flue gas flow reversal at either end, the Powermaster has a minimum of 5 sq ft of heating surface per boiler horsepower. According to company, the three-pass design provides convenience in inspection and cleaning, and the forced draft is an advantage for industries in residential areas. Programming, safety controls are automatic. Orr & Sembower, Inc.

8—FLEXIBLE DRILL works in hard-to-reach spots

The Flex-Drill consists of three parts: a flexible coupling, an extension rod, and a handle. The coupling is a 3-in. length of ¼-in. dia high strength steel cable with steel fittings swaged on the ends. This coupling will bend almost 90 deg. The chuck end has a $\frac{5}{16}$ in. 24 female thread to accommodate a drill chuck while the other end is threaded to fit the ¼-in. dia extension rod. The handle,

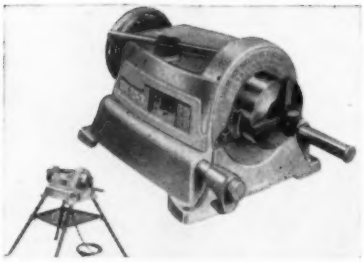


which serves as a bushing for the fitting at the chuck end, is made of Lignum-Vitae, a hard self-lubricating wood. The handle also acts as the guide. Manufacturer of this drill says it is low in cost, requires no maintenance, and can be assembled with accessories for tackling almost any job. Ritmar Corp.

9—THREAD COMPOUND is designed to stand heat

Thred-Gard has been developed to protect against welding action of threaded connections subjected to prolonged exposure to extreme heat. It is said to eliminate seizing and galling at operating temperatures to 1200 F. The compound is non-hardening, it is explained, and acts as a lubricant to allow easy disassembly of threaded connections, even after long service under severe conditions. Company says that dismantling time is reduced, and damage to stud, bolt, pipe joint and plug threads is prevented.

It is pointed out that the reducing torque, Thred-Gard allows fittings to be drawn up to a greater degree of tightness without undue stress or strain, and acts as a protective coating to keep threaded surfaces smooth and insure pressure-tight metal-to-metal contact. Thred-Gard is available in half-pint, pint and quart cans. Crane Packing Co.



10—POWER DRIVE for converting hand pipe tools

The new 88 Power Drive is designed for fast efficient operation of hand pipe threaders, cutters and reamers. Aluminum housing results in weight reduction to 140 lb, and increases ease of portability of this compact, ruggedly built unit, says manufacturer, and it converts hand tools to power in the shop or on the job. Capacity of the drive is ⅛- to 2-in. pipe, ¼- to 1½-in. bolts; with universal drive shaft, geared die stocks and cutters up to 12 in.

Features announced as contributing to powerful speedy and efficient operation include three-jaw scroll chuck on front with six pinions for greater convenience. Protective plate guards the ½ hp unit motor and gearing against damage. Operating on a-c or d-c from any 110-v socket, this drive can be mounted on bench or service truck or furnished with legs and tool tray as accessories. Toledo Pipe Threading Machine Co.

11—FLOOR SWEEPER cleans without dirtying the air

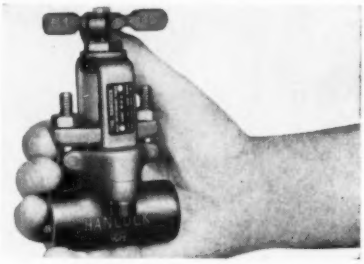
Utilizing a turbine principle, the new Turbo-Sweep is designed to suck dust from the air at a rate of more than 300 cfm, while its heavy-duty fiber brushes are whisking debris into a collecting hopper. Removal and emptying of this hopper takes about 10 sec, says manufacturer; and the dust-collecting bag is large enough (1.6 cu ft) not to need frequent emptying.

A special feature of the Turbo-Sweep is the control console which places all

controls within easy reach of the operator. This console contains throttle, hopper, brush height and clutch controls. Casters provide maneuverability, even in obstructed areas, and the ball-bearing wheels have heavy-duty rubber tires. Of rigid all-steel construction, the sweeper is powered by a 2 hp gasoline engine, is self-propelled, has a silencer to reduce noise. Its 28-in. sweeping width is said to permit cleaning of more than 30,000 sq ft per hour. Parker Sweeper Co.

12—INSTRUMENT VALVE is small, light in weight

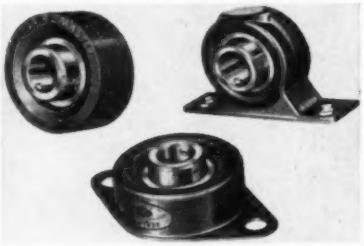
Engineered for instrument panels and lines, gage, by-pass and corrosive lines, and orifice meters, the new 6000-psi Hancock Stainless Steel Instrument Valve is easily handled and weighs only 2¼ lb. Its compactness permits close alignment of piping with near structures. The packing gland can be pulled tight in close quarters, it is noted, and disassembly presents no problem. Use of stainless



steel, where practical, is designed to provide maximum protection against corrosion. Valve comes in ¼-, ⅜- and ½-in. sizes. Manning, Maxwell & Moore, Inc.

13—BALL BEARING UNITS in rubber mountings

Sealmaster Ball Bearing Units are now available in rubber mountings with pressed steel housings. Six shaft sizes, ½ to 1 in., are available as pillow blocks,

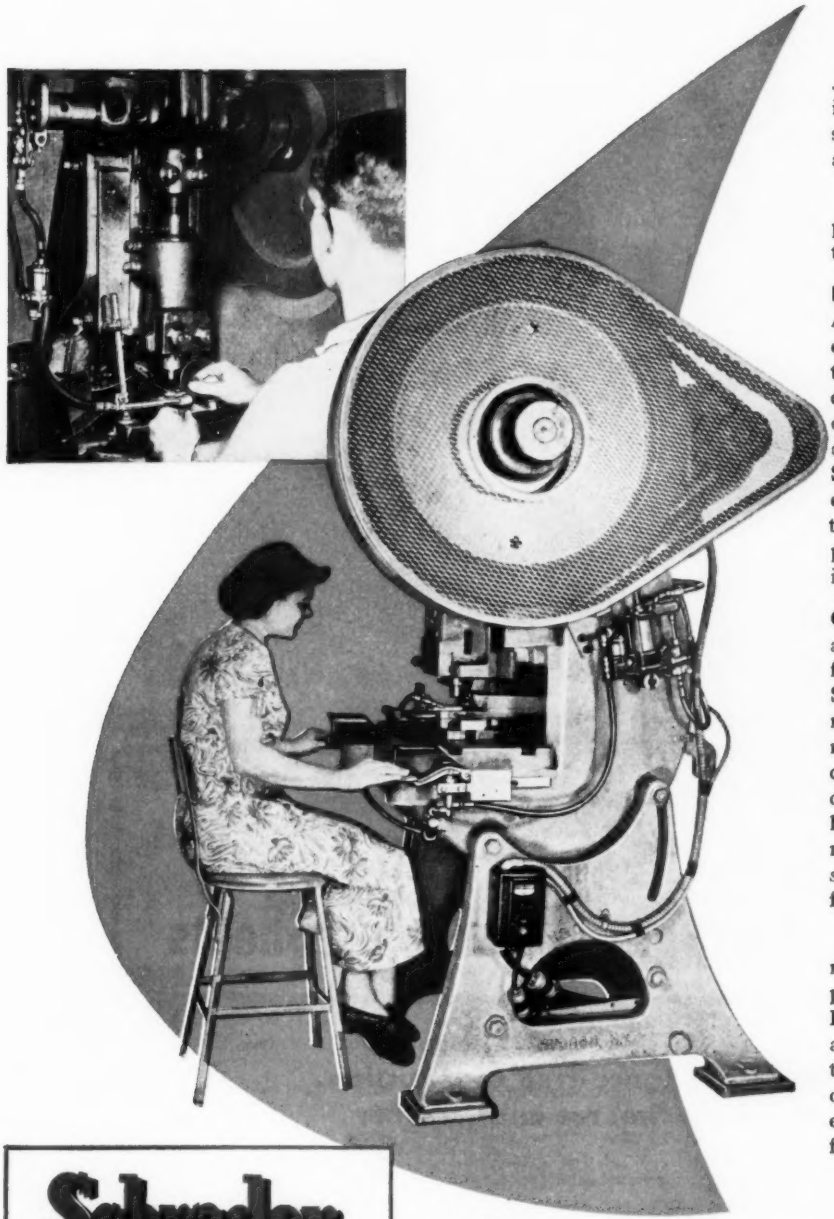


flange and cartridge units. Designed for reduction of noise and vibration, the bearings are said to be particularly adaptable for air conditioning equipment and other light duty applications.

Synthetic rubber mounting rings are oil- and grease-resistant, says company, and bearings are lifetime lubricated. The zone hardening process used on the inner race ring of the units heat treats through the ball path section only. Since the extended portions of the race remain unaffected, the hardened threads of the set screws are able to bind tightly against the soft threads of the race for positive race to shaft locking. Bearing units are grounded to pressed steel housing to prevent build-up of static charge. Housings are designed for rigidity and can be mounted with only two bolts. More information is given in Bulletin 1253. Sealmaster Div., Stephens-Adamson Mfg. Co.

(More New Products on page 140)

Some equipment just naturally boosts production



. . . Schrader Air Controls, for instance. You *can't help* getting smoother, faster operations with air power on your side.

The tireless muscles of compressed air lighten labor all along the production line.

For ejection of work, Schrader Air Ejection Sets automatically eject finished parts . . . eliminate tedious, dangerous hand removal or bulky mechanical devices. Accurately timed to deliver just the correct blast of air, and no more, Schrader Air Ejection Sets are easy on your compressor—while the productivity they add to small presses pays for their installation in a few brief weeks.

On power presses, press brakes, and any machine using either a friction or mechanical clutch, Schrader Machine Controls promote building a high-speed work rhythm that pays big production dividends *with safety*. Operators cannot tie down one of the two hand controls, since *both hands* must operate the valves *at the same time* or the press will not function.

These are only two of the many hundreds of new and improved Schrader Air Control Products that build production and safety in your plant. It's easy to get complete details. Write, outlining your present or projected use of power machinery—or fill out the coupon below.

Schrader

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control the air

Air Cylinders • Operating Valves • Press & Shear Controls • Air Ejection Sets • Blow Guns • Air Line Couplers • Air Hose & Fittings • Hose Reels • Pressure Regulators & Oilers • Air Strainers • Hydraulic Gauges • Uniflare Tube Fittings

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Division of Scovill Manufacturing Company, Incorporated
472 Vanderbilt Ave., Brooklyn 38, N. Y., Dept. J-8

I am interested in more information on.....

Name_____ Title_____

Company_____

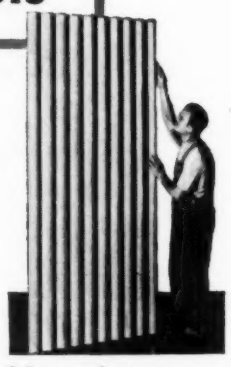
Address_____

For more facts circle 574 on Reply Card

No costly maintenance problem here

Neither process fumes from within, nor salt air and extreme weather will affect the Johns-Manville Corrugated Transite exterior of this recovery furnace building (partial view of St. Regis Paper Co., Jacksonville, Fla.). It requires no paint or special treatment to preserve it, yet it will give years of maintenance-free service.

build with Transite Corrugated Asbestos Sheets



- Large sheets go up quickly
- Easy to fasten to steel
- Easy to nail to wood
- Easy to saw
- Easy to drill

For permanent, maintenance-free construction, plus protection from fire, rot and weather

YOU SAVE MONEY on construction and maintenance when you build with Johns-Manville Corrugated Transite®. Corrugated Transite comes in large sheets that require a minimum of framing . . . permit fast economical construction of maintenance-free industrial, commercial, institutional and agricultural buildings.

Made of asbestos and cement, Corrugated Transite is practically indestructible. It never needs paint or special treatment to preserve it . . . it's fireproof, rotproof and weatherproof. Corrugated Transite is also used increasingly for smart interiors . . . the streamlined corrugations and attractive shadow lines that give it such unusual architectural appeal for exteriors offer unlimited interior design possibilities.

Investigate Johns-Manville Corrugated Asbestos Transite and learn how you can build quickly and easily . . . have an attractive, long-lasting, trouble-free structure regardless of size or purpose. For complete details write Johns-Manville, Box 158, Dept. PE, New York 16, New York. In Canada write 199 Bay St., Toronto, Ontario.

JOHNS MANVILLE JM PRODUCTS **Johns-Manville**

For more facts circle 575 on Reply Card

A house for tomorrow

When Bill Miller first talked to the architect about his new home he stressed his desire to put into it the soundest materials and the newest conveniences.

"I hope my grandchildren will be happy in this house," he explained. "New improvements come fast these days, so let's try to be a few years ahead in our planning."

"What fuel would you like to use?" asked the architect when the discussion reached the heating plant.

"I would prefer to use coal," answered Bill, "I understand it is the most economical fuel here, as it is in most areas. But I don't want my wife to be a furnace-tender."

"With a modern, bin-feed stoker with thermostatic control," said the architect, "your heating will be completely automatic, as well as clean and convenient. And coal has some big advantages – it gives a steady heat, not an off-again-on-again heat. Then there's this for the fellow who looks ahead: I don't know how long these other fuels are going to last. Every year they have to drill their wells deeper, and we are becoming more and more dependent on foreign supplies. As these other fuels get scarcer, they are going to get even more expensive.

"But coal is another story. There is plenty of coal right here in the United States to last us for hundreds—maybe thousands of years. That's something to think about when you're planning a house with the hope that your grandchildren will still be living in it."

COAL
FUEL OF THE FUTURE

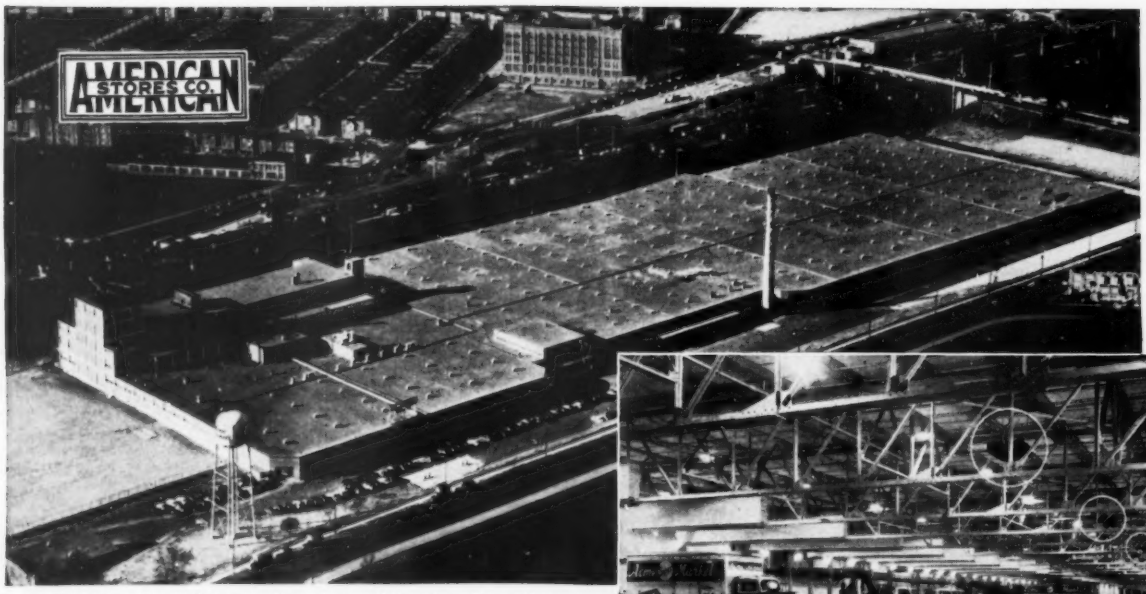
Chesapeake and Ohio Railway

Bring your fuel problems to C&O

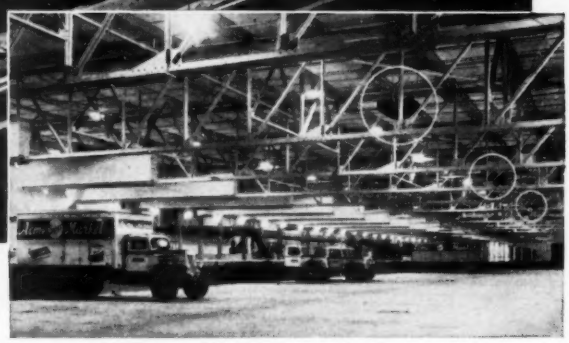
As the world's largest carrier of bituminous coal, the C&O is intimately familiar with every phase of coal use. We have a large staff of experts who will gladly help you to locate the coal best suited to your needs; to help you use it most efficiently; to help get it to you promptly.

Write to:
Coal Traffic Department
Chesapeake and Ohio Railway
2111 Terminal Tower
Cleveland 1, Ohio

For more facts circle 576 on Reply Card



Aerial view of all-new bakery and warehouse of American Stores Company, Philadelphia. Bakery occupies 3-story building at left. Warehouse has platform and siding space for 85 trucks, 22 freight cars. Engineers and Architects: Ganteaume & McMullen, Boston. General Contractor: Hughes-Foulkrod Company, Philadelphia. Heating Contractor: W. M. Anderson Company, Philadelphia.



Webster-Nesbitt Little Giant Down-Blow Units (circled) spot heat throughout high-ceilinged truck-loading area.

Heating a Bakery-and-Warehouse Giant

Steam at 125 lbs. pressure serves dual purpose in mammoth new bakery and warehouse: Supplies needs of bakery equipment and heats vast area through 200 Webster-Nesbitt Unit Heaters . . . Use of high pressure steam allows savings in initial cost of system.

In designing the heating system for this American Stores Company bakery and warehouse in Philadelphia, Ganteaume & McMullen, Boston specialists in bakery construction, chose steam at 125 lbs. pressure. Webster-Nesbitt Unit Heaters are supplied with steam at both 125 lbs. and 35 lbs. High pressure steam permitted worthwhile savings in size of unit heaters and piping.

Low temperature coils in Webster-Nesbitt Unit Heaters reduce temperature of discharged air so that it reaches the floor from heights of 20 to 25 feet. Heat is spotted *where* it is wanted, delivered in the required volume *when* it is wanted. Heated air is mixed thoroughly with room air . . . reduces temperature-stratification and overheating in upper areas . . . assures quick heating, low fuel cost, greater comfort.

Heating equipment includes 141 Little Giant Unit Heaters, 40 Propeller-Fan Units, 17 Giant Blower-Fan Units, 2 Series R Unit Heaters; also Webster Low Pressure Thermostatic Traps, Drip Traps and Dirt Strainers.

Webster's experienced field organization serves architects, engineers and heating contractors. If you plan new construction or heating modernization, call the nearest Webster Representative, or write us for his name.

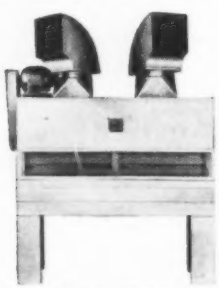
Address Dept. PE-4

WARREN WEBSTER & COMPANY

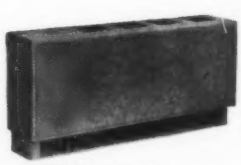
Camden 5, N. J. Representatives in Principal U. S. Cities

In Canada, Darling Brothers, Limited, Montreal

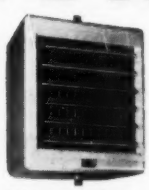
Webster HEATING



Webster-Nesbitt Giant Blower-Fan Unit



Webster-Nesbitt Series R Unit



Webster-Nesbitt Propeller-Fan Unit

Webster-Nesbitt Little Giant Unit

For more facts circle 577 on Reply Card

For more facts circle 578 on Reply Card——→

MODERN EQUIPMENT and closest attention to every casting detail enable new Aloyco foundry to turn out the finest corrosion-resistant valve castings made.

New Aloyco foundry helps process industries in record expansion

PATTERN SHOP. In this well-equipped shop seasoned craftsmen make extremely accurate wood or metal patterns for valves of any size or complexity.

During 1954, almost half the nation's total investment in new plants and equipment will go into the chemical and petroleum industries.

To meet their unprecedented needs for processing equipment, our new specially-equipped foundry will substantially increase the production of Aloyco corrosion-resistant valves.

For 25 years, Aloyco, the world's largest specialist in high alloy valves, has been helping the chemical process industries master valve corrosion problems. Alloy Steel Products Co., Inc., 1301 West Elizabeth Avenue, Linden, New Jersey.

Plants: Linden, N. J.; Bloomfield, N. J.; Elizabeth, N. J.

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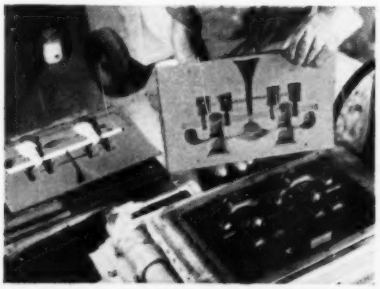
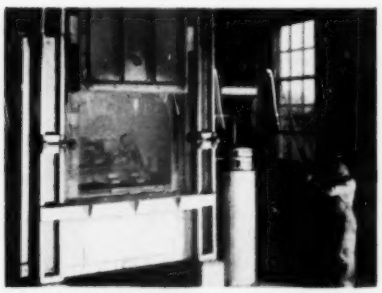
CHICAGO 4, ILLINOIS 332 So. Michigan Ave.
BUFFALO 14, N. Y. 3053 Main St.
HOUSTON 6, TEXAS K. E. Luger Co. 2716 Danville St.
SAN FRANCISCO, CALIF. 24 California St.
LOS ANGELES 22, CALIF. 5442 Jillson St.



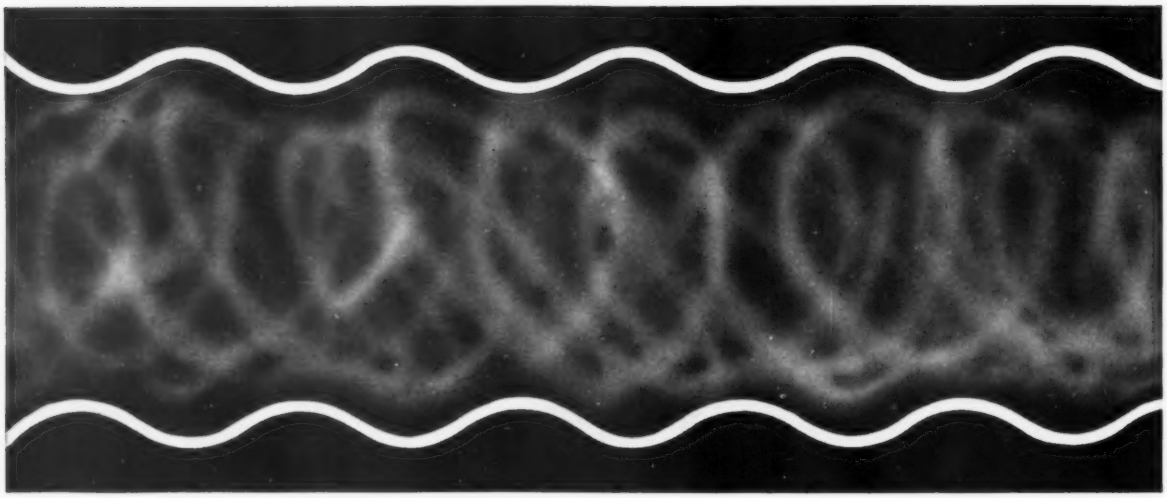
SHELL MOLDING. Up-to-date shell molding facilities assure users of the greatest contour accuracy in castings for small and medium-sized Aloyco valves.

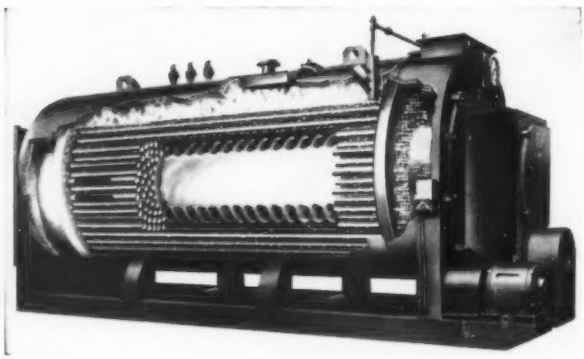
INSPECTION AND HEAT STAMPING. Castings are carefully inspected, their "pedigrees" stamped in. Any not 100% perfect are remelted, never welded or patched.



HEAT TREATING. After cleaning, all Aloyco austenitic type castings are heat treated and water quenched to insure maximum corrosion resistance.

Introducing
Continental's Spinning Gas Technique*





*In the Continental, air is forced through static turbine-like vanes which cause air to enter the furnace with a spinning motion. This technique achieves thorough mixing of air and atomized fuel, better combustion, a slower passage of hot gases through the furnace, and a greater amount of heat transfer. On the second pass, gases are spun again by means of a stationary impeller in each 3" return tube. So much heat is transferred by the two-pass design and spinning gas technique that an independent engineering firm found operating efficiency of the unit under test to be 84.23% . . . with steam quality at 99.43%.

Through use of the spinning gas technique the Continental Automatic Boiler achieves full combustion and over 80% efficiency by means of a two-pass design . . . Due to this technique and design the Continental costs little to maintain, gives long service life, and results in fuel costs equal to, if not lower than most other type packaged units.

Owners report that they can open a Continental for cleaning or inspection in less than a half hour—due to the hinged doors on both ends. Another owner reports fuel savings of 25%—the result of Continental's spinning gas technique and improved design.

For full details on the many exclusive features and advantages of the Continental Automatic Boiler—units from 20 to 500 hp; 15 to 200 lbs. W.P.—write for new Bulletin BE3.

CONTINENTAL BOILER DIVISION
BOILER ENGINEERING & SUPPLY COMPANY, INC.
Phoenixville, Pennsylvania

40 YEARS OF BOILER MANUFACTURING EXPERIENCE

CONTINENTAL is sold, installed and serviced by competent distributors throughout the U.S.

For more facts circle 579 on Reply Card

It's Good Accounting Practice!

TO MEASURE GAS CONSUMED BY INDIVIDUAL FURNACES, KILNS, OVENS, ETC.

Good management goes hand in hand with good measurement. Good managers know that by metering individual gas furnaces, kilns, ovens, etc., they will have accurate figures upon which to base product costs. They know that metered records of gas consumption will quickly show-up combustion deficiencies that affect the quality of the end product. They know, too, that with a meter standing guard over every department and at the inlet to every set of burners, wasteful fuel practices are discouraged.

Why don't you investigate the advantages of in-plant metering? Write the nearest Rockwell district office or use the handy coupon.

ROCKWELL "800" GAS METER

Lightweight aluminum dry-gas meter having a capacity of 800 c.f.h. at the accepted ½ in. differential when measuring 0.60 specific gravity gas. One of the complete line of Rockwell gas meters ranging in capacity from 150 c.f.h. to 10,000 c.f.h.

USE THE HANDY COUPON

Other Useful Rockwell Meters

ROCKWELL FLOW INDICATING METER

Measures rates of flow. Read directly from graduated scale in c.f.h. Time and money-saving production tools for manufacturers of gas appliances to use when setting, adjusting and testing flow rates.

ROCKWELL TEST METER

Fits the need for a gas meter with a large dial to be used in test or laboratory work. Ideal for visually demonstrating the consumption of gas appliances.

YOU CAN RELY ON ROCKWELL

ROCKWELL MANUFACTURING COMPANY

PITTSBURGH 8, PA. Atlanta Boston Chicago Dallas Houston Kansas City, Mo. Los Angeles New York Philadelphia Pittsburgh San Francisco Seattle Tulsa

In Canada: Peacock Brothers Limited

5441 P

ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PA.

Gentlemen:

I am interested in your meters for measuring gas to individual furnaces ☐. Your flow indicating meters ☐. Your test meters ☐. Please send literature ☐. Have representative call ☐.

Your Name .....

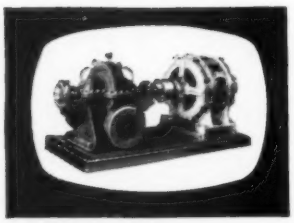
Company .....

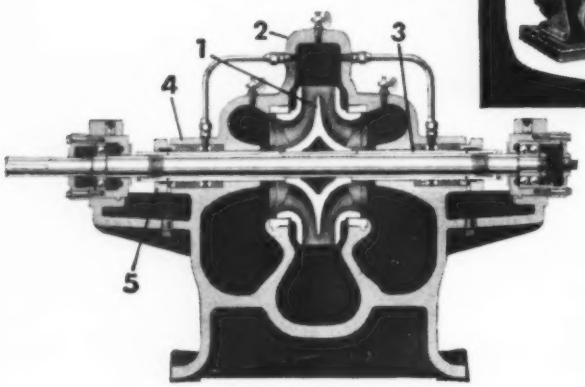
Street .....

City ..... Zone..... State.....

For more facts circle 580 on Reply Card

GOULDS Fig. 3450—Single-stage centrifugal pump; Capacities up to 15,000 G.P.M. Heads up to 500 ft.





These 5 features mean

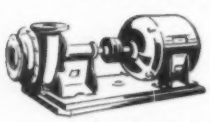
HIGH PUMPING EFFICIENCY LOW MAINTENANCE COST LONG SERVICE LIFE

Whenever you need a pump for *general water supply, in-plant circulation of liquids, booster service or low pressure boiler feeding,* check the economy features these sturdy Goulds single-stage centrifugal pumps offer.

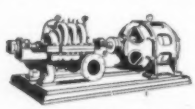
1. **Hydraulically balanced impellers** assure freedom from vibration.
2. **Horizontally split casing,** matched and dowelled, makes access to working parts easy. All water passages exceptionally smooth due to careful core making.
3. **Heavy bronze shaft sleeve** ground to smooth finish reduces friction. Saves power. Reduces wear on packing.
4. **Deep stuffing box** and bronze water seal ring minimize chance of leakage.
5. **Gland horizontally split and bolted** to make repacking easy.

These pumps are available in all-iron or all-bronze construction, as well as standard bronze fitted. Maximum interchangeability of parts keeps inventories at a minimum. For complete details and specifications call your Goulds representative or send for Bulletin 721.2.

Other GOULDS PUMPS for power and plant services



GOULDS Fig. 3169
Single stage centrifugals for general processing purposes. Capacities to 1100 G.P.M. Heads to 180 ft.



GOULDS Fig. 3310
Multi-stage centrifugal pumps for boiler feed and pressure service. Capacities 40 to 2000 G.P.M. Heads to 850 ft. Bulletin 722.1.

GOULDS Fig. 3650
"Close-coupld" single-stage centrifugal for general industrial use. Capacities to 2000 G.P.M. Heads to 400 ft. Bulletin 710.1.

MEMBER HYDRAULIC INSTITUTE USA

Goulds PUMPS INC. Seneca Falls New York

For more facts circle 581 on Reply Card

NEW PRODUCTS

(Begins on page 130)

14—STEAM TRAPS for fast heating of steam units

Tests of the new Heat-Kwik Super-Silvertop Steam Trap are reported to show that it vents air out of steam consuming units eight times faster than many inverted bucket traps, and three times faster than air eliminator or blast type traps tested. More production, lower steam consumption and longer trap life are other advantages announced.

The trap's air-venting is accomplished by two separate orifices, one for condensate and a separate bellows orifice for air. When the trap is cold, the bellows orifice is wide open and handles large quantities of air rapidly. After all of the air is removed through it, the bellows expands and closes the orifice, it is explained. Thereafter, air is removed through the vent hole in the bucket.

These traps require a trap factor of never more than 2 to 1, says company, and this low trap factor enables the use of a less expensive Heat-Kwik Steam Trap than normally required. The head of the trap may be opened for inspection or servicing without removal from the pipeline. The trap comes in sizes from ¾ to 1¼ in., suitable for pressures to 150 psi. The V. D. Anderson Co.

15—VINYL PLASTIC TAPES come in eight colors

Now that they are available in colors, Dutch Brand Vinyl Plastic Tapes are expected to have increased industrial application. They are UL listed, it is pointed out, and thus suggested for use in colored wire electronic assemblies. Wide usage is also predicted for them wherever indexing, coding, packing and industrial decorating can be better done with Vinyl tapes in color.

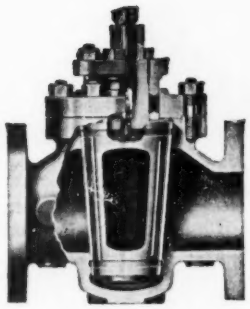
The tapes are claimed to have excellent adhesive qualities and high resistance to oil, grease, acids and corrosive chemicals. They come in four widths from ⅜ to 1 in., in red, yellow, green, blue, gold, silver, black and white. Van Cleef Div., Johns-Manville.

16—OIL SKIMMER reclaims oil used in manufacturing

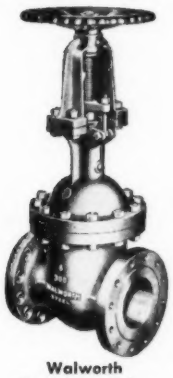
Operating from the liquid level in a chamber through which oil is flowing, this device is designed to automatically and constantly skim oil from liquid surfaces, regardless of the liquid levels in the collection tanks or chambers. Manufacturer says it can be applied wherever reclamation of oil exists, and it also provides a

● VALVES

● PIPE FITTINGS



Walworth
Lubricated Plug Valve



Walworth
Steel Gate Valve

Walworth
Iron Body Gate Valve

Walworth
"500 Brinell" Bronze Globe Valve

Walworth
Iron Body Saddle Gate Valve

Walworth
Cast Steel Flanged Fittings

Walworth manufactures a *complete line* of valves and pipe fittings: all made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties. In design, construction, and performance, Walworth products reflect more than a century of experience in the manufacture of quality valves and fittings.

Your Walworth distributor will give you full information on the *complete line* of Walworth steel, iron, and bronze, and special alloy valves and pipe fittings; also Walworth Lubricated Plug Valves, and Walseal* valves, fittings and flanges. Ask for this information today.

*Patented—Reg. U. S. Pat. Off.

WALWORTH

valves and fittings

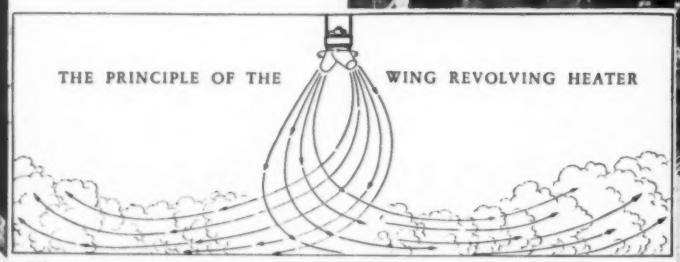
60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

For more facts circle 582 on Reply Card

HEAT THAT MOVES AROUND

THE fact that the discharge outlets of WING Revolving Unit Heaters keep the heated air in constant, gentle motion is one of the reasons why nationally known firms like the Budd Company have installed them in their plants, both at Philadelphia and in the one shown in this photograph, at Gary, Indiana. The big blanking and forming presses in this great plant present a natural barrier to ordinary fixed discharge heating systems, but not to the moving streams of heated air from the WING Revolving Heaters, even suspended, as they must be, far above the floor, to clear the cranes. That is equally true in the summer time when, with steam turned off, the cooling breezes from the revolving discharge outlets keep workers comfortable on the hottest days. Investigate. Write for Bulletin HR-6.



The moving streams of heated air (or cooling breezes in summer) sweep slowly around through 360 degrees, covering successively every direction. The air velocity is sufficient to carry to walls, and remote corners and the constantly changing direction of flow causes the air to find its way around obstructions.

Wing

L. J. Wing Mfg. Co.
177 Vreeland Mills Road
Linden, New Jersey
Factories: Linden, N.J. and Montreal, Can.
In Europe: Etab. WANSON, Brussels, Belgium

For more facts circle 583 on Reply Card

NEW PRODUCTS

(Begins on page 130)

means of preventing oily waste discharge into rivers and streams.

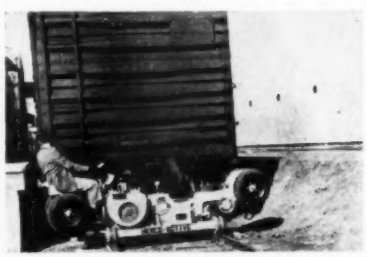
The oil skimmer consists of: a movable trough with rollers and supporting guide rod; a hydraulic cylinder with compound lever attachment; a four-way hydraulic valve with hydraulic power pack; and a counterweighted float and cable assembly. These four groups of equipment are mounted on the wall of a chamber, with float and trough operating in a vertical plane. Operating mechanisms are stainless steel or bronze, while other metal parts are covered with heavy preservative coatings.

In operation, the float moves up or down with the level of the liquid in the tank and maintains the trough at such a level that its lip is a little below the liquid. Since the oil to be reclaimed floats on the surface of the liquid, it flows over the lip and is filtered through screens. Simplex Valve and Meter Co.

17—SWITCH ENGINER offers rail n' road operation

A roadable switch engiiner, the HemcO-Motive switches and spots railroad cars. The secret of its large pulling capacity is said to be the hydraulic weight transfer cylinder, which transfers the car's weight onto the HemcO-Motive, giving it necessary traction on its drive wheels to pull the load.

The HemcO-Motive is designed to pull or push any type of rail car through switches, over crossovers and around



curves. It can move cars from either side, with ample visibility for the operator to see the length of his train, company says. It is designed to develop a draw bar pull of 7400 lb generally enough to propel three loaded cars or six to eight empties. It moves the cars at 150 fpm and trav .ls at a speed of 8 to 10 mph on the rubber tires. It's equipped with fluid drive for easier handling. Hemco Mfg. Co., Inc.

18—REPRODUCTION FILM for plant layout projects

This clear, adhesive-backed diazotype film can be processed through any ammonia-vapor type developing machine. It produces a solid black-line, as well as a graded tone image, in direct positive from tracings, drawings or templets, says manufacturer, no intermediate step is required. The film has a self-adhesive

HALL INDUSTRIAL WATER REPORT

Hall Laboratories, Inc.—A Subsidiary of Hagan Corporation, Pittsburgh, Pa.

Volume 2 APRIL 1954 Number 2

Long-Standing Boiler Sludge Problem Cleared Up

A manufacturer in Western Pennsylvania found the remedy for frequent acid cleaning of low pressure boilers when Hall sales engineer, L. C. Bishop, called on him to discuss the problem of sticky sludge. From the analysis of the feed water and a deposit from the boiler, Bishop recognized that the long-standing difficulty with sticky sludge was due to silica deficiency.

Until Hall was put on the job, alkalinity control and phosphate residuals had been adequate, but an attempt to eliminate the sticky sludge by use of a dispersive had not produced the desired results. Hall service engineer B. Q. Welder instituted treatment with silicate to overcome the silica deficiency. One month later an inspection showed that build up of deposit on the boiler surfaces had been reduced. Accumulations which had not been removed by an acid cleaning job just prior to starting Hall treatment were now being removed by the silicate feed.

The operators found the boiler cleaner than it had ever been. To quote the foreman, "We can see surfaces of the shell that we haven't seen for ten years."

Analytical Chemistry and Spectroscopy Conference

The fifth annual Conference on Analytical Chemistry and Applied Spectroscopy was held in Pittsburgh, March 1st through 5th, by the Analytical Chemistry Group, Pittsburgh Section, ACS, and the Spectroscopy Society of Pittsburgh. R. K. Scott of Hall Laboratories was co-chairman of the Conference-Exposition committees.

The program included sessions in which papers on new developments in analytical chemistry and spectroscopy were presented.

Hagan Corporation displayed Hall Certified Reagents and related equipment, and the new Calgon Speedy-Kit for testing water hardness.

American Power Conference

Sponsored by the Illinois Institute of Technology with the cooperation of a number of universities and technical societies, the American Power Conference was held in Chicago, March 24, 25 and 26. The Conference featured a Diamond Jubilee Dinner celebrating the 75th anniversary of the invention of electric light.

Four sessions of the Conference were devoted to water technology. In one, a paper, "Boilers and Boiler Waters—Interlocking Advances in Design," by H. M. Rivers and S. B. Osborne, was presented by Mr. Osborne, Staff Engineer of Hall Laboratories.

Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information, write, wire or call Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

Water is your industry's most important raw material. Use it wisely.

Thorough Study Solves Boiler Problem

On the basis of a single and inaccurate raw water analysis, a manufacturing plant in the midwest installed a sodium cycle softener. Only when construction was finished was Hall Laboratories called in. The Hall engineers, in starting up the boilers, advised the plant engineers that the pretreatment equipment was not suitable for their particular conditions. However, since the boilers were ready to go on the line, it was decided to try to operate. Then real trouble set in.

Contrary to the original analysis, the raw make-up water had a high bicarbonate content, so that the sodium cycle softening resulted in extremely high boiler-water alkalinity. Carryover and the necessity for excessive blowdown were only the beginning of the problems involved. Serious corrosion in the condensate piping occurred because of high carbon dioxide in the steam.

At this point it was evident that a complete study of the water problems had to be made if satisfactory conditions were to be established. Beginning with analyses of the plant water and carrying through to recommendations for the best equipment to prepare the water for its intended use, Hall headquarters engineer L. Highley considered all the existing factors in making the survey. Revamping of the entire pretreatment setup to provide dealkalization is now under way.

A survey prior to plant construction could have provided for the right equipment to do an efficient job at a cost far lower than the outlay entailed in the revision of the initial setup.

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For more facts circle 585 on Reply Card

NEW PRODUCTS

(Begins on page 130)

coated back covered with protective paper. You simply print it in a reproduction machine, peel off the backing and mount to any film grid sheet or drawing.

The new film is announced as especially suitable for plant layout templets or repeat details in engineering drawings, for mapping, charts and graphs. A printed sample sheet and catalog are offered. Repro-Templets, Inc.

19—CONTACT ELECTRODE for high-speed welding jobs

Best suited for work on mild and medium carbon steel, this new contact welding electrode is suggested for welding machinery, low pressure storage tanks, and light structural work. Company engineers say it is suitable for many welding operations requiring AWS classes E6012 and E6020 electrodes. Tests are reported to show that the new product produces a higher rate of weld footage than many electrodes. It is also claimed that more metal is deposited per unit of arc energy with this electrode than with many covered electrodes, and that the

quantity of deposited metal exceeds some manual automatic processes.

Encased in a rutile-type covering enriched with iron powder, this electrode can be used on horizontal and flat position fillets and laps, single and multiple pass butts, and deep grooves and cover passes on multiple-pass butt welds. It is pointed out that since the electrode is of the contact type, less effort is expended and less welding skill required of the operator. General Electric Co.

20—LAMINATING ADHESIVE is water- and fire-resistant

Insulam is described as a self-extinguishing fire-resistant laminating adhesive for adhering glass fiber insulation pads and blankets to sheet metal, aluminum foil, fabrics, wallboard and other assembly operations. It is a synthetic rubber-like resin emulsion with quick wet-tack and suction to hold assemblies together until dry. It then becomes a water-resistant adhesive film that will not support combustion, company explains, and the bonding strength of assemblies withstands continuous heat of 375 F.

Among the uses of Insulam are adhering fiber glass batts to air conditioning ducts, coverings to furnaces pipes, power piping; boiler lagging operatings; lami-

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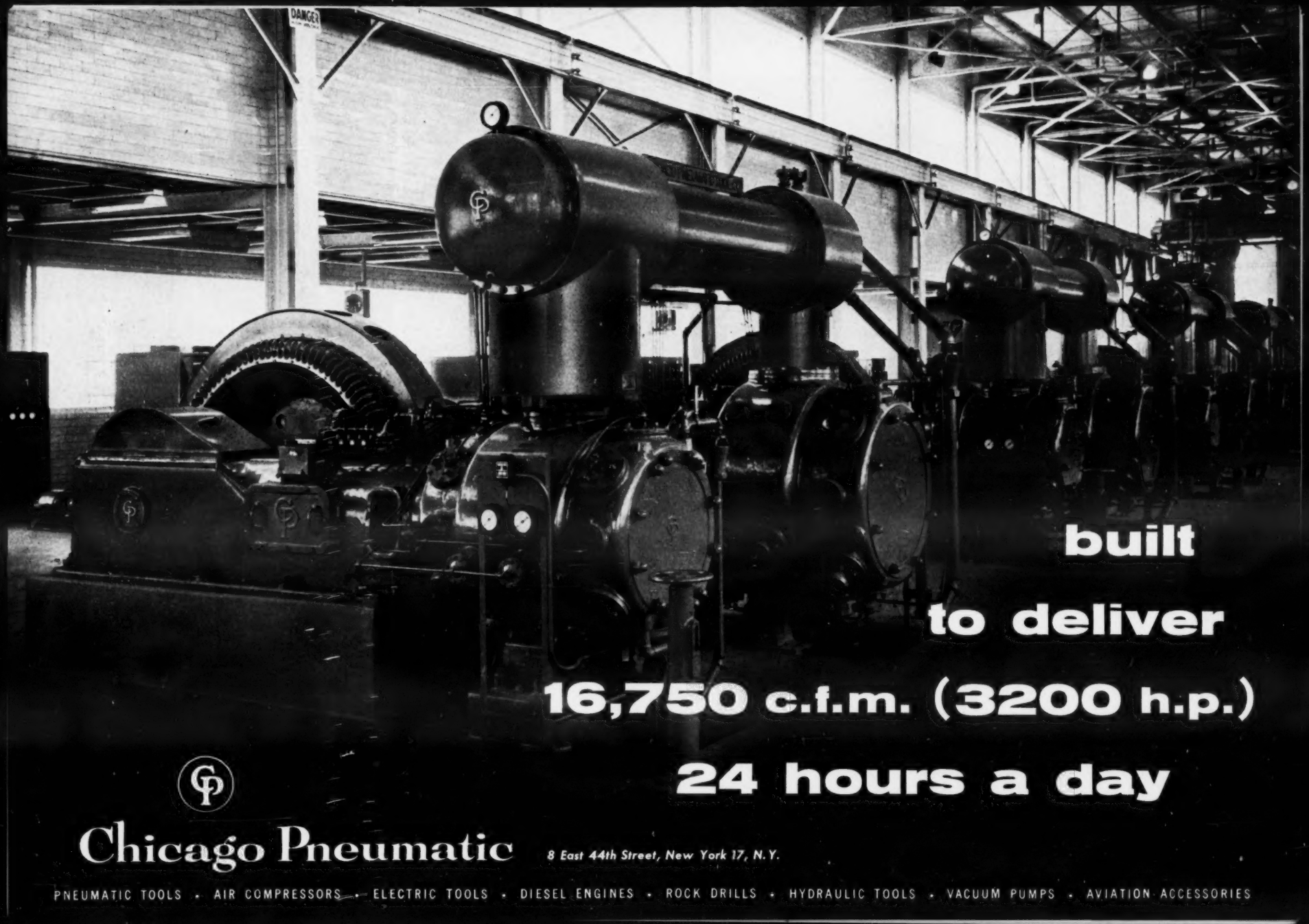

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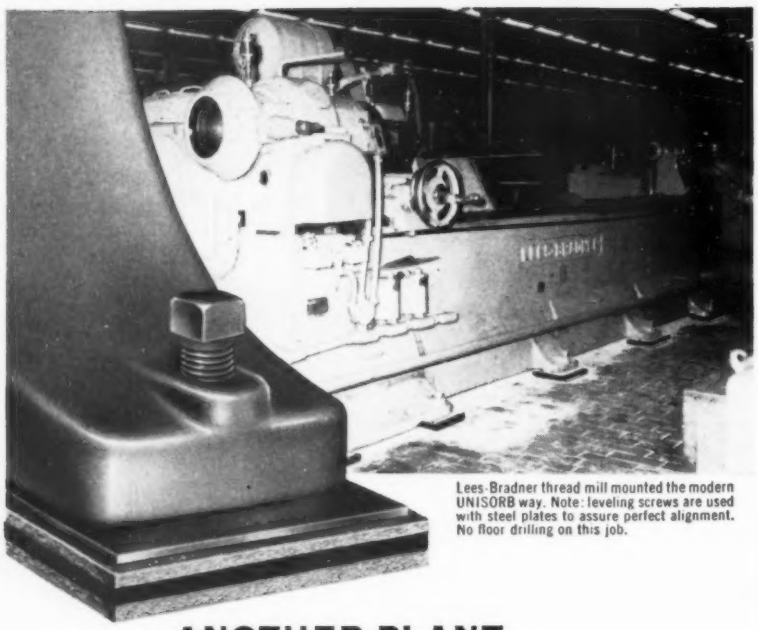

Lees-Bradner thread mill mounted the modern UNISORB way. Note: leveling screws are used with steel plates to assure perfect alignment. No floor drilling on this job.

ANOTHER PLANT ELIMINATES 60 TO 85% OF ALL VIBRATION AND NOISE BY USING

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You can simplify machine installation (no bolts or screws, no floor drilling) by getting the complete story about UNISORB mountings.

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There is a type of UNISORB mounting for almost every type of machine, from a biggest lathe or grinder to the smallest punch press. In addition to providing a firm, positive mounting method, UNISORB permits repositioning of machines without damage to floors. Write for your copy of the UNISORB Book. It tells the complete story.

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NEW PRODUCTS

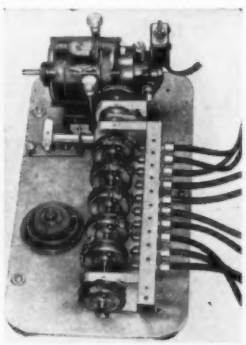
(Begins on page 130)

nating asemblies of fiber glass to foil, vinyl films and other non-porous surfaces. The material weighs 9.6 lb per gallon, is a light tan color, and dries with a tough but flexible transparent film. Test report is offered. Paisley Products, Inc.

21—TIMER for sequence control of air cylinders

This new electro-pneumatic timer controls action of air cylinders in a wide variety of sequences. The normal unit, as shown, operates 12 single-acting or six double-acting cylinders, but by increasing the number of rotors and cams a larger number of cylinders could be handled.

The machine consists of a small electric motor geared to a revolving shaft;



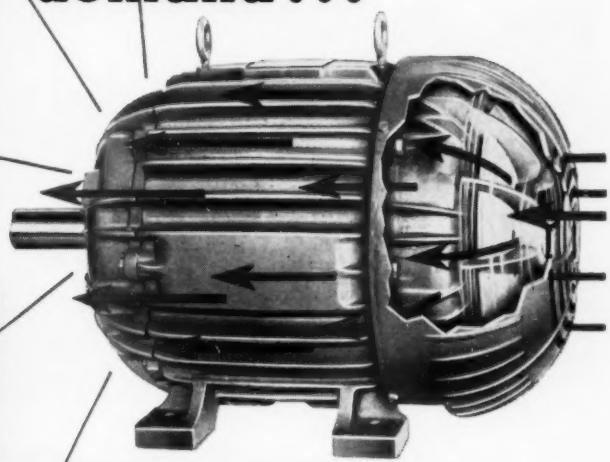
mounted on the shaft is a series of rotors, each with four adjustable cams. As the cams revolve with the shaft, they trip miniature poppet valves which convey a compressed air impulse to the operating valves. In addition to the variations in the cycle obtained by moving the cams, the duration of the cycle can be regulated by changing the motor gears. A set of 10 quick-change gears is designed to permit cycle variations from 3 to 33 secs, and a lockout lever to permit instant change from continuous operation to a "one shot" push button cycle. Mead Specialties Co.

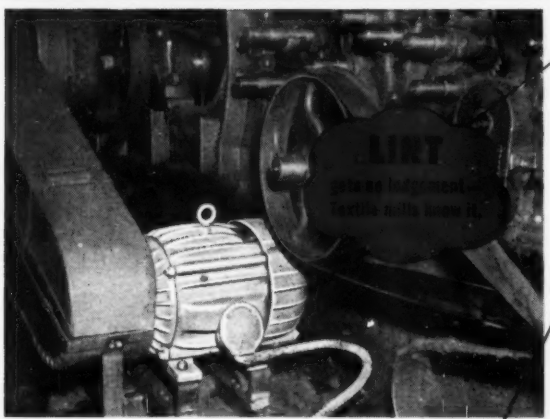
22—MECHANICAL RECTIFIER for low-cost d-c power

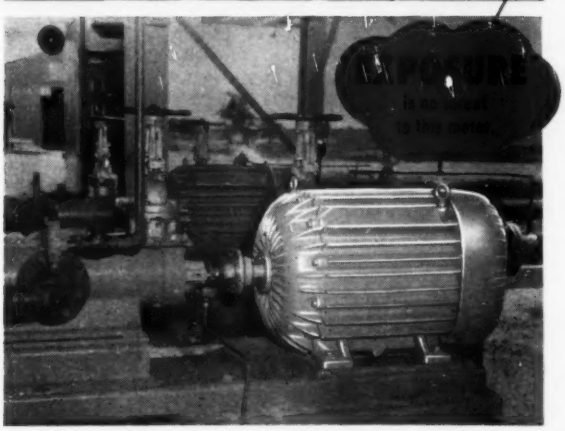
A mechanical rectifier unit substation for providing d-c power is designed to offer stable operation with long contact life. According to company engineers, this has been achieved through research on mechanical design and improvements in the bias circuits of the commutating reactors. The substation is said to have an efficiency of more than 96 per cent, including losses in the transformer, switchgear and associated equipment.

These units provide up to 12,000 amp at voltages up to about 250 v d-c. Above this voltage, units are usually rated 6000 amp up to approximately 500 v d-c. Several rectifier units may be operated in parallel to provide larger amounts of current if required. The rectifier is designed to be an integral part of a substation equipment line-up for transformation of

Tough conditions demand . . .







ELLIOTT C-W *Sealedpower* MOTORS

The ribbed frame provides effective heat radiation . . . The fan-driven cowl-directed air-blast carries off the heat, and also prevents the settling of dust on the motor frame, which would tend to reduce heat dispersion . . . The streamlined fan has no corners to collect dirt . . . Cowl can be quickly removed if or when necessary. Here is a TEFC motor you can put anywhere. Wide range of modifications for specific needs. Sizes 1 to 100 hp, NEMA frames. Ask your local Elliott representative for full data, or write for bulletin to Elliott Company, Crocker-Wheeler Division, Ampere, N. J.

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MOST FLEXIBLE. You can reach and hold any condition in response to instrument settings, or vary it as you wish.

EASIEST TO TAKE CARE OF. The machine is accessible, the control circuits are simple and easy to operate, and there are no solids, salts or solutions to be handled.

MOST COMPACT. It does a very large amount of work in a small space.

INEXPENSIVE TO OPERATE. At normal atmospheric temperatures (unlike systems that use refrigeration to dehumidify) it needs no summer re-heat.

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NEW PRODUCTS

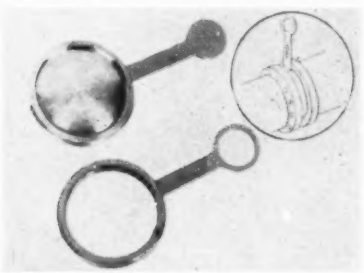
(Begins on page 130)

a-c to d-c. Equipment is completely metal-enclosed, and the compartments have drawout facilities so that the rectifier may be drawn out easily for inspection. Standard metal-clad switchgear controls the a-c power supplied to the rectifier and helps protect both the a-c supply system and the rectifier equipment in case of faults within the transformer or rectifier. Protection for the d-c circuits is provided by single-pole air circuit breakers. General Electric Co.

To receive product data circle item numbers on the handy Reader Service Cards on pages 37-38 and 187-188.

23—BLINDS, SPACER RINGS are light, low priced

Visi-Tab is the trade name of new, lightweight lower cost blinds and spacer rings for pipe lines. Because Visi-Tabs extend beyond the pipe flanges, it is easy to identify whether the unit is a blind that is completely sealing a flow shut-off or a spacer ring that is providing an open flow. And, as further identification, the blinds have blank discs at the end of the tab while the spacer rings have an open



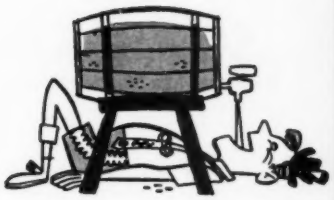
ring. The small space required by Visi-Tabs is of importance where pipe lines are close together in parallel. Savings in inventory and investment costs are possible, says manufacturer, because a spacer ring may be used in another pipe line while the corresponding blind is in use.

Since they are mass produced, Visi-Tabs offer a price advantage; they are available in sizes for standard pipe lines, for raised face, ring-type joints, and tongue and groove flanges with a full range of ASA service pressure and temperature ratings. They can be furnished in a wide range of metals. Engineering Corp. of America.

24—TESTING LIQUID finds small gas or air leaks

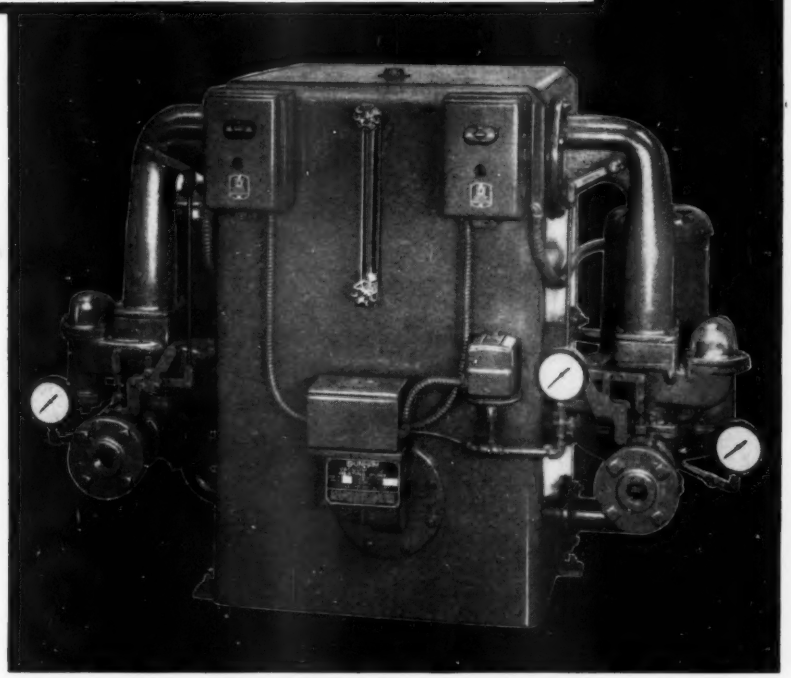
Leak-Tec is a non-flammable, non-explosive liquid designed to detect minute leaks where gas or air is used. It is described as non-injurious to the person using it. When squirted on surfaces or around

SAVE DOWN TIME...ALL THE TIME!



"Low return lines"

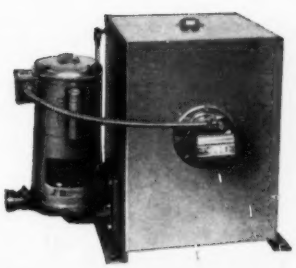
"Only one principal moving part"



With Dunham Vacuum Pumps you don't have to waste time or money making frequent adjustments or replacing worn parts. After installing them . . . you virtually forget 'em, except for occasional routine maintenance.

Since there's *only one* principal moving part . . . and no close clearance parts . . . these pumps continue to pull and maintain up to 26" vacuum—and do it for years without repairs. Single motor, mounted high and dry, easily handles *both* air and condensate removal.

Dunham Pumps are easy to install, too. With return line connections at such low level, 9⅛", there's no need for expensive "pitting." Three anchor bolts hold it fast. Full range of sizes and types, both single and duplex models. For complete information, clip and mail the coupon.



Dunham Condensate Pumps assure fast, positive condensate removal. Mechanical seal eliminates stuffing box maintenance. New low cost. Completely wired for immediate use. Side-mounted motors. Anchor bolts secure pump to floor. Single and Duplex models.

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Today more than ever
HEADQUARTERS FOR SCALES
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NEW PRODUCTS

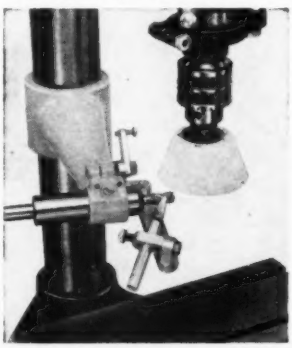
(Begins on page 130)

piping, it will penetrate rust scales, cracks, and creep over surfaces, creating bubbles where the leak occurs. No brushing is required. Uses include gas installations, testing for leaks on gas filled electric cables and transformers, refrigeration and air conditioning equipment. It is also used in inspection of finished products and delicate instruments on the assembly line. It comes in plastic bottles. American Gas and Chemicals, Inc.

25—SHARPENING DEVICE for drill press end mills

End mills may now be sharpened on drill presses equipped with this milling attachment. The only extras needed, says the manufacturer, are an emery wheel mounted in the drill chuck and an adjustable guide finger fastened on the spindle support bracket.

Cutters to be sharpened are placed in the milling spindle which, with the spindle bearing, is placed in a horizontal



position. The guide finger is then adjusted to support the cutter on the flute just below the cutting edge, which is far enough ahead of center to provide the desired clearance. The grinding wheel is brought down to contact the cutter directly above the guide finger and the grinding done while the cutter is being guided along the guide finger, with the drill press spindle stop regulating the depth of each cut. To sharpen end mills on the end, the grinding wheel is brought down across the end of each flute. The attachment is priced at around $6.50. Waterborg Machinery Co.

26—CIRCUIT BREAKERS for use in hazardous areas

A new switched neutral circuit breaker lets the plant engineer use standard XO circuit breaker load centers in complying with the latest NEC rulings for circuits to gasoline and dispensing pumps and overcurrent devices in permanently grounded conductors.

The neutral circuit is switched by one pole of the XO breaker which does not have overload elements. The line side ground connection is made by a flexible pigtail connecting the contacts to the standard load center neutral. The "hot" leg line connection is automatically made

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- FACTORY ASSEMBLED
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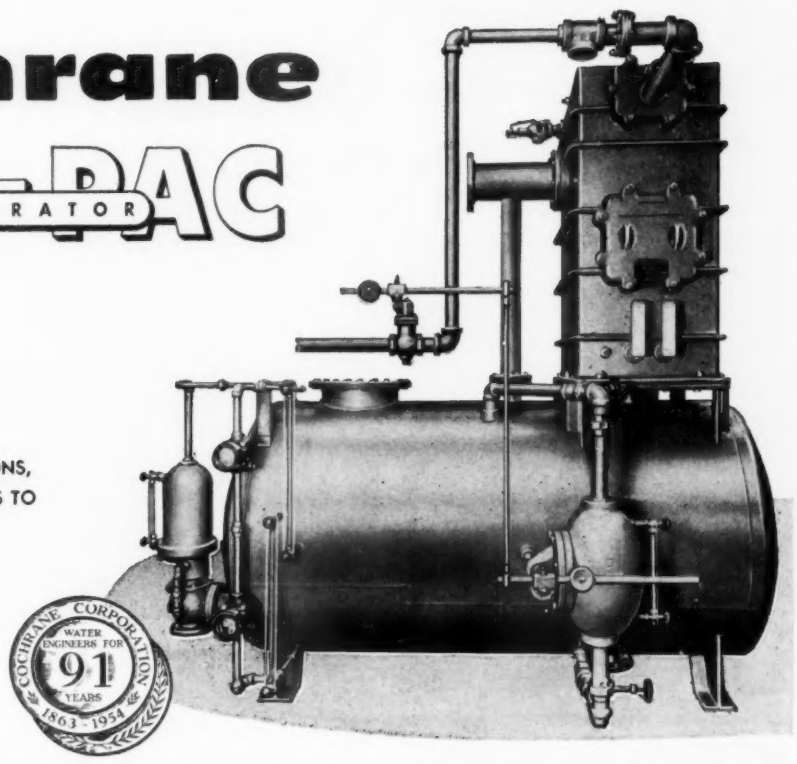

Here's the deaerator every small and medium-size plant has been waiting for!

Now for the first time you can get a ready-to-install deaerator that will give you high quality boiler feedwater at extremely low cost. The UNI-PAC DEAERATOR is guaranteed to deliver water with an oxygen content not to exceed 0.005 c.c. per litre (less than 7 p.p. billion)—generally recognized as zero oxygen!

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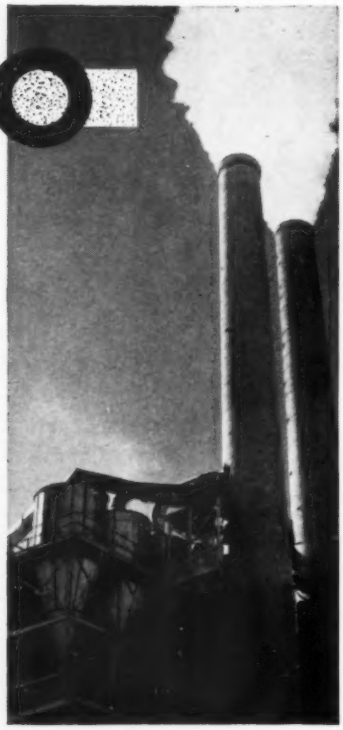
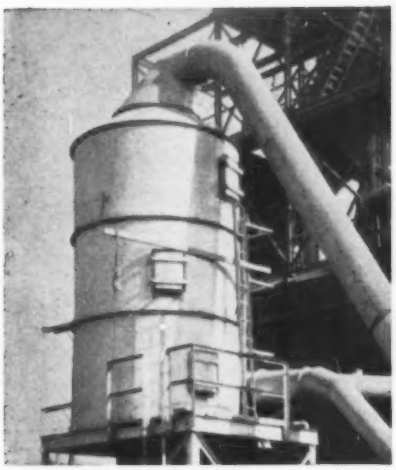
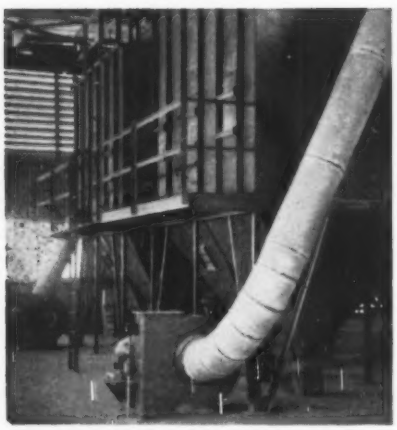


Centrifugal



Hydraulic



Automatic Bag Type

WHATEVER your need for dust or fume control, Norblo builds rugged, efficient equipment in Centrifugal, Hydraulic and Bag type collecting systems. These three types, frequently used in certain combinations, provide economical dependable control as required in smelting, rock products, chemical, milling and processing fields.

Norblo Systems make outstanding records for high recovery with low operating and maintenance costs. Profit by Norblo's 30 years experience in heavy duty collection and Norblo development of these basic types of equipment. For good advice on dust or fume problems, consult Norblo.

The Northern Blower Company

Engineered Dust Collection Systems for All Industries

6423 Barberton Ave. OLympic 1-1300 Cleveland 3, Ohio

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NEW PRODUCTS

(Begins on page 130)

by plugging the breaker onto the conventional XO bus. This "hot" side of the circuit is protected by a quick-make, quick-break thermal-magnetic operating mechanism. This breaker, Underwriters' approved, may be combined with other standard XO breakers for lighting or general duty circuits in conventional XO loadcenters, it is noted. Square D Co.

27—STATIC CONDENSER is small sized, low priced

This new condenser dissipates heat by natural convection, requires only minimum space and is priced lower than many units available. It features a unique construction of thin expanded metal and tubing which, according to company, gives it the advantages of high efficiency, small size, light weight and easy installation. It can be installed without mounting brackets and formed units can be mounted so as to provide a streamlined shroud for the compressor. Kold Hold Div., Tranter Mfg., Inc.

28—LEAD COATING is new type of rust preventive

Offered as a solution to the steel rusting problem, Blakled is neither a conventional paint skin nor a pigment ground into a vehicle. It "fills in" the surface of steel and replaces moisture and air on a steel surface, it is explained, thus eliminating a principal cause of rust. Blakled may be applied to wet, brushed rusted surfaces, dry or light mill scaled steel. It dries in an hour, may be dipped, sprayed or brushed. U. S. Steel Supply Div., United States Steel Corp.

One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

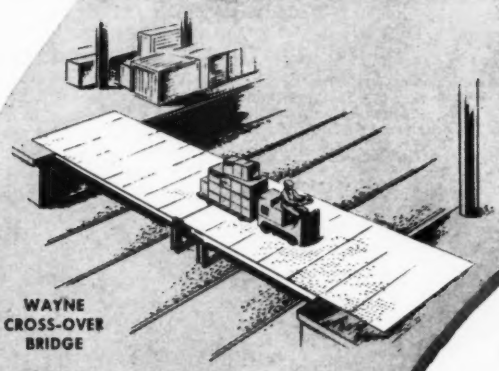
29—SHEET BLASTER cleans steel at high speeds

The ES-503 Rotoblast is said to clean steel sheet and plate up to 54-in. wide at a rate of 20 fpm lineal. It was developed to meet demands for improved finish on steel sheet, a method to provide better bonding surface for paint, and cost reduction through the use of hot rolled sheet. According to manufacturer, it can clean in excess of 200 sq ft per minute, and its two wheels throw 160,000 lb of abrasive per hour.

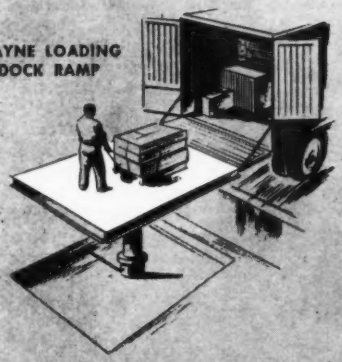
This machine is designed to take steel sheet or plate into the blast chamber automatically, blast its surface and remove all abrasive before discharging the sheet. Cleaning is done by a blow-off fan which deposits the abrasive in a spiral conveyor. An elevator carries it up through the

For more facts circle 594 on Reply Card——→

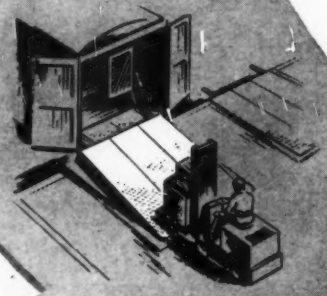
CUT THE HANDLING IN MATERIALS HANDLING WITH



WAYNE CROSS-OVER BRIDGE



WAYNE LOADING DOCK RAMP



WAYNE MATERIALS LIFT

Wayne LIFTS

BOOST PRODUCTIVE MAN HOURS SAVE TIME, LABOR, DOLLARS

Simplify materials handling! Eliminate unnecessary "run-around hauls," loading and re-loading . . . install Wayne's System of LIFTronics.

WAYNE CROSS-OVER BRIDGES reduce costly and wasteful hauling, speed traffic and do away with the need for ramps between buildings. Available to suit every need and location—single and double bascule, turntable and straight lift platforms.

WAYNE PLATFORM LIFTS speed loading where no dock is available, simplify inventory stocking, expedite all elevator type operations. Can be adapted to unusual handling problems—lifting large rolls of paper in printing plant, feeder on machines, etc. Available in single and double post types made to fit your exact specifications.

WAYNE LOADING DOCK RAMPS have proved they can cut loading time by as much as 75%. Loading or unloading, just back up the truck, push the button and the Wayne Loading Dock Ramp is adjusted to correct height. Factory trucks can roll on or off easily.

Answer your materials handling problems with Wayne LIFTronics. Write for the new book on materials handling giving engineering data, installation photos, etc.

THE WAYNE PUMP COMPANY

SALISBURY, MARYLAND • TORONTO, CANADA

Wayne

NATION WIDE SERVICE

How to REDUCE BEARING REPLACEMENT COST

Get The **ONE** *Spherical That Lasts*

2 to 3½ times LONGER

That's right—this *improved* SKF (Type "C") Spherical Roller Bearing provides, size for size, 2 to 3½ times more life, up to 50% increased capacity . . . more than any design available anywhere . . . at no increase in price.

Obviously, when you tell your SKF Distributor you want this Type "C" Spherical, you're minimizing future replacement cost. And your SKF Distributor has many available sizes in stock.

Have him *show* you how the famous SKF spherical design has been improved to deliver this exceptional capacity and life.

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA. — *manufacturers of* **SKF** *and* HESS-BRIGHT® *bearings.* 7535

SKF®
BALL AND ROLLER BEARINGS

For more facts circle 595 on Reply Card

NEW PRODUCTS

(Begins on page 130)

abrasive separator and reclaimer for recycling. Standard equipment for the ES-503 includes two wide-vane wheels each powered by a 50-hp, 1800-rpm motor, but smaller wheels may be ordered. Pangborn Corp.

30—TRACTOR for year 'round grounds maintenance

A low-cost, sturdy garden tractor, the Springfield Champ has interchangeable attachments for use as a rotary weed cutter or mower rotary tiller, snow plow or blower. Powered by a 2 hp gasoline engine, this tractor has a removable self-propel mechanism for easier handling. It has throttle and clutch controls, and the handle may be folded up for storage. Attachments can be used for all types of cultivation jobs, light grading or bulldozing, mowing of grass, and snow clearance. The tractor sells for $109.50; with attachment group, for less than $200. Quick Mfg. Co.

31—FLOW CELL ASSEMBLY is small, easily serviced

Ease of removal of the conductivity cell, for cleaning or inspection, is a feature announced for this compactly designed conductivity flow cell assembly. It can be used in conjunction with a conductivity meter or recorder to determine electrical conductivity of condensed steam and feedwater. The assembly is less than 10 in. long, and the cell itself is so small there is practically no holdup to level out differences in conductivity, it is pointed out.

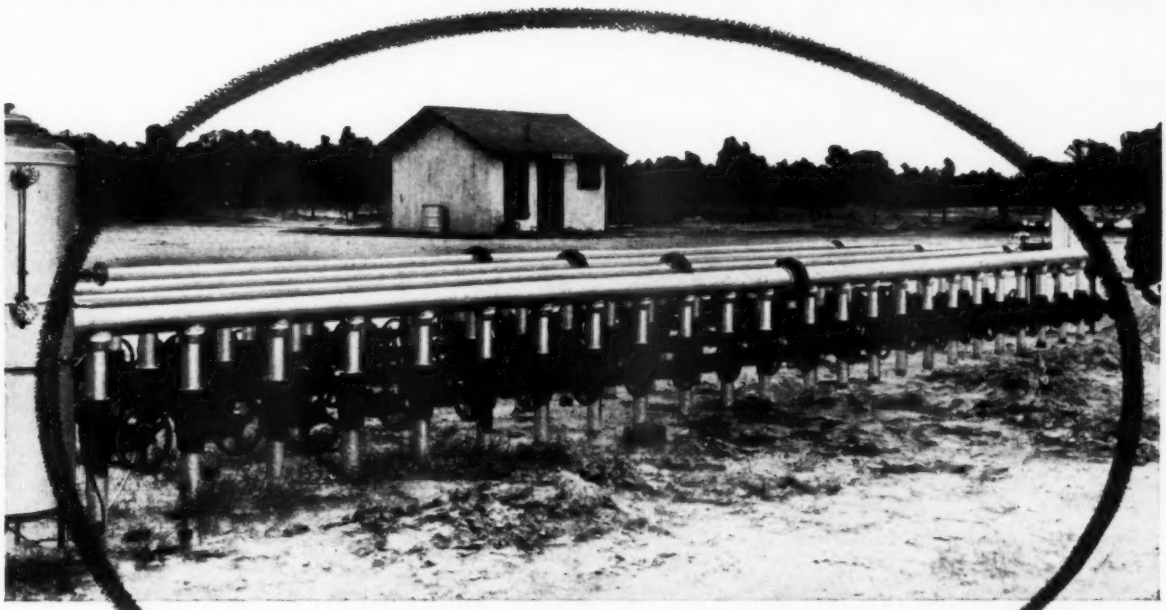
The assembly can be furnished with cells having different constants. A bimetallic dial reading thermometer is standard. A flexible coupling with rubber O rings and back-off nuts are incorporated for easy removal of cell. Except for the glass cell, the principal "wet" components are stainless steel. Hagan Corp.

32—FORK TRUCK is low cost, gas powered unit

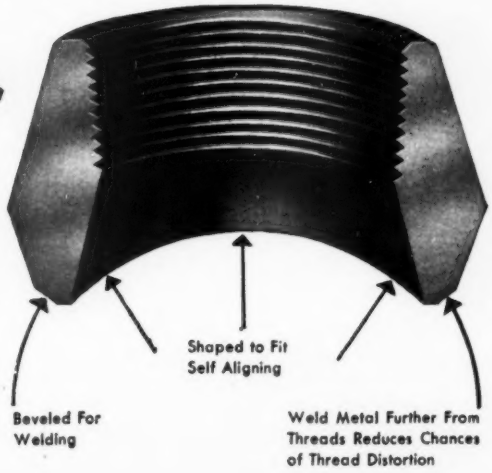
The Yardloader, a low-cost gasoline engine 4000-lb fork truck for outside or rough-surface work, features a travel speed of 14 miles per hour. High travel speed makes it suitable for yard handling jobs requiring movement of materials over large areas.

Additional features are large pneumatic tires, exceptionally high ground clearance, extra heavy drive axle and an oscillating trail axle to permit operation over unimproved or semi-improved sur-

BOOST YOUR PRODUCTION with THREDOLETS and SOCKET WELDOLETS!



ThredOlets at work in L. P. Gas Plant Production Separators. 4" x 2" ThredOlets utilized for branch connections on manifolds subjected to contraction, expansion and vibration. The ThredOlet's short height and wide footing creates rugged branch construction.



Insure production economy in pipe fabrication through the *exclusive* features *engineered* and *manufactured into* ThredOlets and Socket WeldOlets. Production is boosted because you weld *more pieces* per hour!

Instant application and immediate availability will save you time, labor and money in constructing all 90° Threaded and Socket-weld branch connections.

SPECIFY AND USE...
BONNEY THREDOLETS & SOCKET WELDOLETS

FOR COMPLETE ENGINEERING DATA WRITE FOR YOUR BONNEY W-3 WELDOLET CATALOG
DISTRIBUTORS IN PRINCIPAL CITIES

ThredOlets

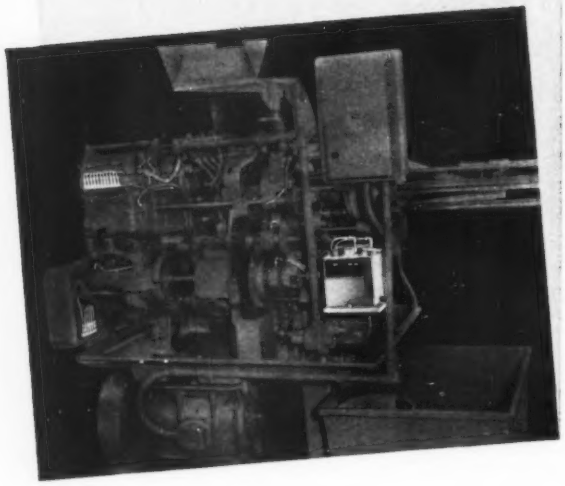
Socket WeldOlets

WELDING FITTINGS DIVISION
BONNEY FORGE & TOOL WORKS
ENG. DEPT., 727 MEADOW STREET
ALLENTOWN, PENNSYLVANIA

For more facts circle 596 on Reply Card

PULSOLATOR

The Automatic Lubricator that can be 400 places at once as often as 20 times a minute



Yes, Pulsolator can dependably lubricate as many as 400 bearings with a controlled quantity of oil, as frequently as 20 times a minute, through a single system with loop line up to 300 feet.

Here is your answer to reliable, automatic lubrication for machine tools, printing presses and similar equipment where the higher pressures of force feed systems are not essential. Pulsolator can save you money by eliminating oil waste and repairs and down time that come from lubrication failures resulting from human oversight or neglect.

Systems with various capacities and with both gravity and pressure feeds are adaptable to an endless variety of applications. Let experienced Manzel engineers show you how Pulsolator automatic lubrication can lower your costs and speed production efficiency. Write:

Manzel

DIVISION OF FRONTIER INDUSTRIES, INC.
301 BABCOCK STREET BUFFALO 10, N. Y.

For more facts circle 597 on Reply Card

NEW PRODUCTS

(Begins on page 130)

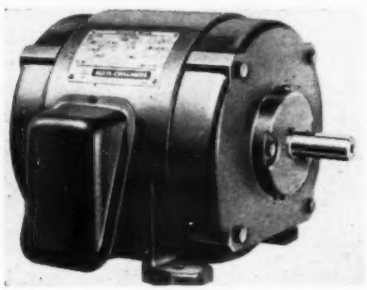
faces. Powered by a valve-in-head Case industrial engine, it has a standard lifting height of 122 in. The truck uses a low-pressure hydraulic system and its motor-driven gear pump supplies oil under pressure to either lifting or tilting cylinders, with speed controlled by acceleration of the engine, and excess by-passed to the reservoir. The Baker-Raulang Co.

33—UMBRELLA RACK holds boots and rubbers, too

Having eight openings for umbrellas and three shelves for overshoes or rubbers, the Stormrak permits a tidy arrangement of stormy weather paraphernalia. Built of heavy-gage welded steel, the rack is finished in gray enamel, has removable drip pans. Vogel-Peterson Co.

34—NEW MOTORS offer equal capacity in smaller size

A new line of a-c squirrel cage induction motors in frame sizes 326 and smaller, following the new NEMA standards, is announced. Open drip-type (shown), totally-enclosed fan-cooled standard, and totally-enclosed fan-cooled explosion proof models are included in the new line. In



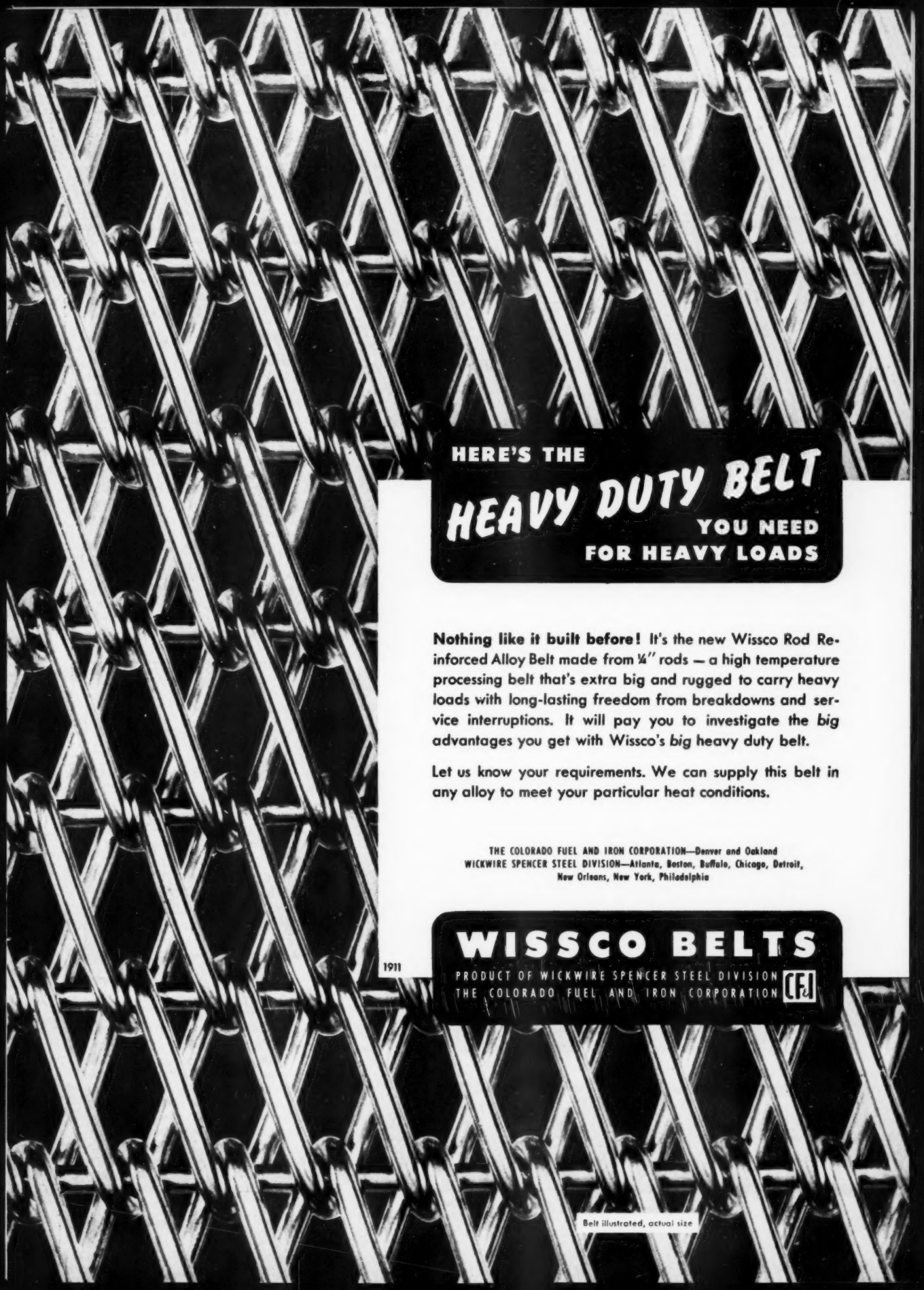
appearance, they will be similar to manufacturer's present designs. They will have cast-iron frames and end shields and aluminum rotors. Bearings will be grease lubricated, medium series, double-shielded ball bearings, which can be re-lubricated without dismantling the motor.

In the new open motor, intake openings in the end shields have greater protection than in the old design, according to company. Located in the bottom half of the end shield, these openings are high enough above the base to minimize the probability of incoming air sweeping dust or lint from the floor or base. Production is now under way on these new motors in frame sizes 182 and 184 and the larger frame sizes will be available later. Allis-Chalmers Mfg. Co.

35—IODINE DISINFECTANT doesn't sting or stain

Iodine is combined with a compatible synthetic detergent in Showersan, says manufacturer of this new industrial disinfectant. The formulation is claimed to render the iodine non-irritating and non-staining. Showersan is designed to prevent the spread of athlete's foot in shower

For more facts circle 598 on Reply Card →



HERE'S THE

HEAVY DUTY BELT

YOU NEED
FOR HEAVY LOADS

Nothing like it built before! It's the new Wissco Rod Reinforced Alloy Belt made from ¼" rods — a high temperature processing belt that's extra big and rugged to carry heavy loads with long-lasting freedom from breakdowns and service interruptions. It will pay you to investigate the *big* advantages you get with Wissco's *big* heavy duty belt.

Let us know your requirements. We can supply this belt in any alloy to meet your particular heat conditions.

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION—Atlanta, Boston, Buffalo, Chicago, Detroit, New Orleans, New York, Philadelphia

WISSCO BELTS

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION CFI

1911

Belt illustrated, actual size

READING CRANES ARE CUSTOM-BUILT

To Assure You
Faster, Lower Cost
Materials Handling Operations

When you have a READING CRANE installed in your plant, you get a crane CUSTOM-BUILT to meet your specific materials handling operation—at no added engineering cost!

Known as UNIT DESIGN, this unique method of crane construction reduces your costs in two ways:

1. LOWERS FIRST COST—Because READING CRANES offer you a choice of several interchangeable motor, control, and hoisting units, you buy no "extras" to solve special handling problems.
2. REDUCES MAINTENANCE COSTS—All of the operating parts in a READING CRANE are easily accessible for overhaul or repair. The UNIT DESIGN feature makes it possible to remove any one unit without expensive "breaking down" of other units.

See your distributor for information on how you can get a READING CRANE "tailor made" to your own specifications. Drop us a line for your free copy of "The Why and How of Faster Production".

READING CRANE & HOIST CORPORATION 2103 Adams St., Reading, Pa.

READING CRANES
CHAIN HOISTS · OVERHEAD TRAVELING CRANES · ELECTRIC HOISTS

For more facts circle 599 on Reply Card

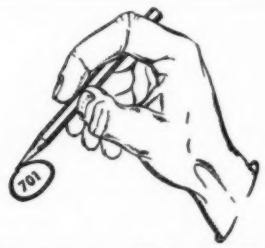
NEW PRODUCTS

(Begins on page 130)

rooms and wherever the organism may be exposed to human touch. Its detergent action is said to make it an effective cleanser that will penetrate cracks and crevices to clean and sanitize in one operation. Showersan also offers a visible indication of germicidal activity. When its yellow-brown color begins to fade after prolonged usage, it is a warning that the germicidal properties are becoming dissipated and a fresh solution should be made. West Disinfecting Co.

36—PIPE THREAD COMPOUND offers chemical resistance

For use on chrome, chrome plate, nickel steel, ceramic and plastic pipe threads, and for joining or connecting dissimilar materials, this new compound is called Flexrock 25, Teflon Pipe Dope. Its lubricating qualities are said to prevent galled threads and permit easier pipe joining that can be readily dismantled even after long periods of exposure to rigorous conditions. Tests on lines conveying strong acids, alkalies and solvents at temperatures of –150 to 500 F are reported to indicate good sealing achieved without application of maximum torque. Also, it is noted, the compound's biological inertness widens its field of application. It is now available in 4-oz. cans for test purposes, priced at around $5.00. Packing Div., Flexrock Co.



It's easy to obtain product data with the postage-free Reader Service Cards on pages 37-38 and 187-188. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

37—FLOODLAMP for long service indoors or outdoors

A new R-40 Weatherproof Floodlamp, built for long service under severe operating conditions, is made of glass, designed to resist cracking during sudden temperature changes and moisture. Manufacturer says it can be used indoors and outdoors without enclosed fixtures.

A silver reflector sealed inside the lamp is not affected by dirt or corrosion, it is noted, and the base is nickel-plated to prevent "freezing" in the socket. Spe-

JENKINS PRACTICAL PIPING LAYOUTS 72

Diagram by Huxley Madeheim, Consulting Engineer
Copyright, 1954 — Jenkins Bros.

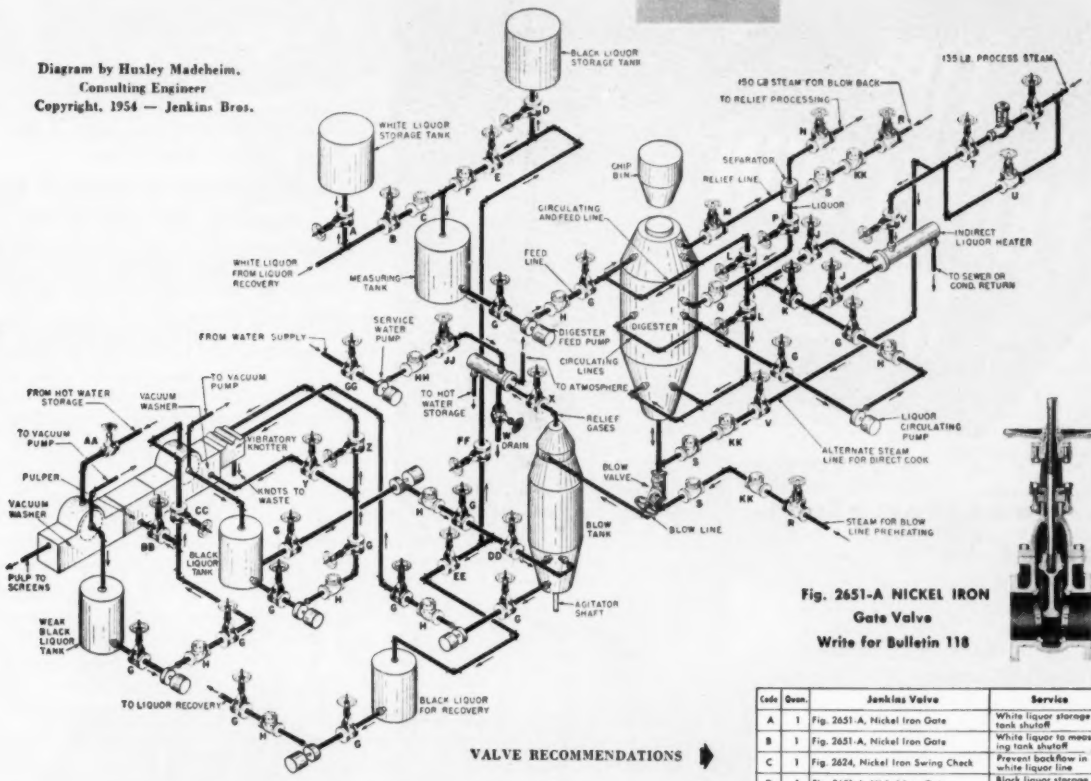


Fig. 2651-A NICKEL IRON Gate Valve
Write for Bulletin 118

VALVE RECOMMENDATIONS

Code	Quan.	Jenkins Valve	Service
A	1	Fig. 2651-A, Nickel Iron Gate	White liquor storage tank shutoff
B	1	Fig. 2651-A, Nickel Iron Gate	White liquor to measuring tank shutoff
C	1	Fig. 2624, Nickel Iron Swing Check	Prevent backflow in white liquor line
D	1	Fig. 2651-A, Nickel Iron Gate	Black liquor storage tank shutoff
E	1	Fig. 2651-A, Nickel Iron Gate	Shutoff black liquor to measuring tank
F	1	Fig. 2624, Nickel Iron Swing Check	Prevent backflow in black liquor line
G	14	Fig. 2651-A, Nickel Iron Gate	Liquor Pump shutoff
H	7	Fig. 2624, Nickel Iron Swing Check	Prevent backflow through pump
J	2	Fig. 2651-A, Nickel Iron Gate	Liquor heater shutoff
K	1	Fig. 2651-A, Nickel Iron Gate	Liquor heater bypass
L	2	Fig. 2651-A, Nickel Iron Gate	Liquor circulating line shutoff
M	1	Fig. 1317, Stainless Steel Globe	Digester relief control
N	1	Fig. 1317-A, Stainless Steel Globe	Control flow of relief gas
P	1	Fig. 2651-A, Nickel Iron Gate	Shutoff liquor from separator
Q	1	Fig. 1331, Stainless Steel Swing Check	Prevent backflow to separator
R	2	Fig. 1040, Cast Steel Globe	Control steam flow
S	3	Fig. 1331, Stainless Steel Swing Check	Prevent liquor flow to steam line
T	2	Fig. 1009, Cast Steel Gate	Control valve shutoff
U	1	Fig. 1040, Cast Steel Globe	Control bypass steam
V	2	Fig. 1009, Cast Steel Gate	Steam shutoff
W	1	Fig. 106-A, Bronze Globe	Drain line control
X	1	Fig. 1307-A, Stainless Steel Gate	Blow tank vent shutoff
Y	1	Fig. 2651-A, Nickel Iron Gate	Black liquor shutoff to washer pan
Z	1	Fig. 2651-A, Nickel Iron Gate	Black liquor shutoff to knotter
AA	1	Fig. 106-A, Bronze Globe	Control water to wash spray
BB	1	Fig. 2651-A, Nickel Iron Gate	Black liquor shutoff to pulper
CC	1	Fig. 2651-A, Nickel Iron Gate	Black liquor shutoff to wash spray
DD	1	Fig. 2651-A, Nickel Iron Gate	Black liquor shutoff to blow tank
EE	1	Fig. 2651-A, Nickel Iron Gate	Black liquor shutoff to recovery
FF	1	Fig. 2651-A, Nickel Iron Gate	Black liquor shutoff to storage
GG	1	Fig. 651-A, I.B.B.M. Gate	Service water pump shutoff
HH	1	Fig. 624, I.B.B.M. Swing Check	Prevent backflow through pump
JJ	1	Fig. 613, I.B.B.M. Globe	Control water supply
KK	3	Fig. 1025, Cast Steel Swing Check	Steam line check

How to plan a SULPHATE PULPING PROCESS SYSTEM

Chemical treatment begins when chips, conveyed to the digester, are cooked in an alkaline solution of sodium sulphide and caustic soda. The residual spent solution (black liquor) is used in subsequent processing, or is restored to its original state in a chemical recovery cycle. The resultant economy is an important advantage of the sulphate process.

The digester fluid is prepared by combining the alkaline solution, either new or recovered (white liquor), with black liquor from the digester discharge, in a predetermined ratio. This blended liquor is pumped into the digester simultaneously with the chips. A liquor circulating pump thoroughly agitates the mixture, and liquor drawn from the center of the digester bypasses the indirect liquor heater and is returned to the bottom of the digester. When the charge is completed, the digester is closed, and the cooking begins.

An indirect heater is used for cooking in sulphate pulping, generally, to prevent excessive dilution of the liquor. This layout also shows an alternate steam line for direct cooking.

When the cooked mixture is ready for removal, the blow valve is opened and the charge is transferred to the blow tank where it is washed and cooled.

In a series of vacuum washers, the pulp is forced onto revolving drums. As the drum revolves, the pulp is washed by sprays. From the last washer, it goes to the paper making process.

Black liquor collected from the first washer is stored for re-use in the digester, pumped to the blow tank for washing the pulp, or pumped to the recovery cycle for conversion to white liquor. This recovery process will be described in a later Jenkins Layout.

Jenkins Nickel Iron Gates and Checks with Stainless Steel Trim are recommended in this system, for valves in contact with black or white liquor.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

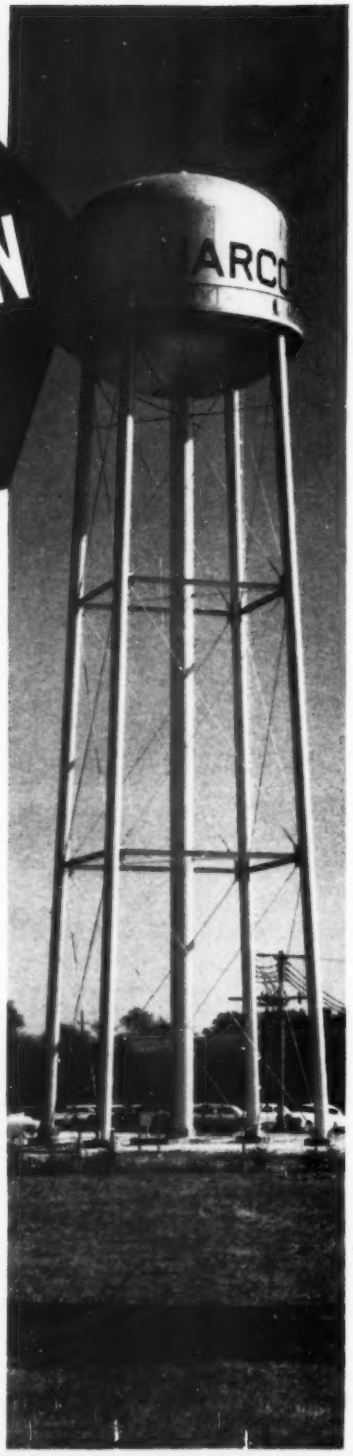
To simplify planning, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17. Sold through leading Industrial Distributors everywhere.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Ask for Piping Layout No. 72.

JENKINS VALVES
CODE FOR THE DIAMOND MARK
SINCE 1864
Jenkins Bros

For more facts circle 600 on Reply Card

FIRE PROTECTION HERE



. . . another plant plays safe . . .

The 100,000-gal. Horton® ellipsoidal-bottom elevated tank shown at right, provides a dependable gravity water supply for 1,138 sprinkler heads at UARCO's Watseka, Illinois, plant. The complete fire protection system—opening of sprinkler heads and flow of water—is automatic. This is the type of plant fire protection system that pays off in greater security and often leads to reduced fire insurance premiums.

Horton elevated tanks with ellipsoidal-bottoms are built in standard capacities from 15,000 to 500,000 gallons. For plant fire protection systems we also build Waterspheres and suction tanks. For further information, please write our nearest office. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3 ..... 2148 Healy Building
Birmingham 1 ..... 1555 North Fiftieth Street
Boston 10 ..... 1067-201 Devonshire Street
Chicago 4 ..... 2134 McCormick Building
Cleveland 15 ..... 2258 Midland Building
Detroit 26 ..... 1569 Lafayette Building
Houston 2 ..... 2166 C & I Life Building
Los Angeles 17 ..... 1574 General Petroleum Building
New York 6 ..... 3317-165 Broadway Building
Philadelphia 3 ..... 1649-1700 Walnut Street Building
Salt Lake City 4 ..... 570 West 17th South Street
San Francisco 4 ..... 1582-200 Bush Street
Seattle 1 ..... 1370 Henry Building
Tulsa 3 ..... 1669 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

NEW PRODUCTS

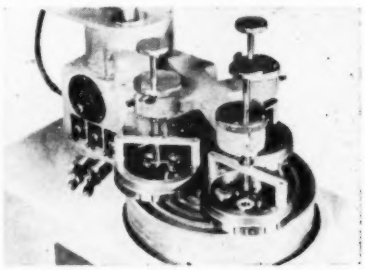
(Begins on page 130)

cial high-temperature solder is used on contacts. Available are standard volt 300- and 500-w lamps with mogul bases. The 300-w model is also made with a medium skirted base for conventional medium sockets. Bulletin 14 gives further information. Radiant Lamp Corp.

38—IMPROVED METHOD for lapping shoulder faces

A new method for lapping shoulder faces of shafts has been developed by manufacturer of the Lapmaster Lapping Machine. The method consists of providing the lap plate with annular grooves to accommodate the stem of the workpiece and allowing the shoulders to "ride" the top of the plate during the cycle. Fuel pump parts are pre-loaded into a brass cylindrical work holder which has been bored out slightly over-size to the diameter of the workpiece. These workholders provide both weight and balancing properties.

Adjustable roller guides at the base of the conditioning ring guide stems are so located that parts being lapped will be



held in position. Ball bearing races in the guides reduce friction and the work is free to rotate in its own orbit on the lap plate. Conditioning rings are spring loaded to overcome wear caused by the work on the lap plate. This provides greater downward force of the conditioning rings on the lap plate, it is explained. Spring tension is controlled by the set screw, and an indexing measure is provided on the spider bar arm cap. With this method, a proper setting of conditioning ring can be obtained at any time, company says. Crane Packing Co.

39—SEALING COMPOUND for threads; Teflon based

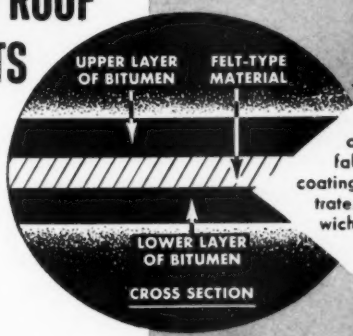
T-Film, a Teflon-based compound, is said to form a continuous film, preventing spiral wicking and leakage, and contamination of material being conveyed. It is declared suitable for metallic and plastic threaded connections in all types of process pipe lines and apparatus. Because of Teflon's non-adhesive characteristics, this compound seals against fluids and gases under pressure, manufacturer states; yet it permits joints to be easily broken when necessary, eliminating galling and sheared threads. Thus, alloy fittings can be reused, it is pointed out.

Two consistencies of T-Film are of-

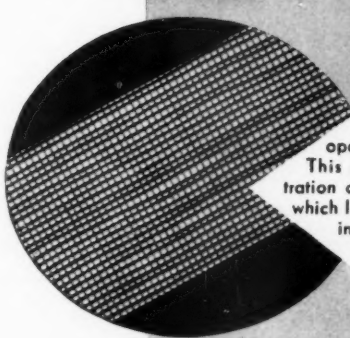
important news on roof maintenance

NEW *GLASFAB* METHOD CUTS COST OF ROOF RESURFACING, ASSURES BETTER RESULTS

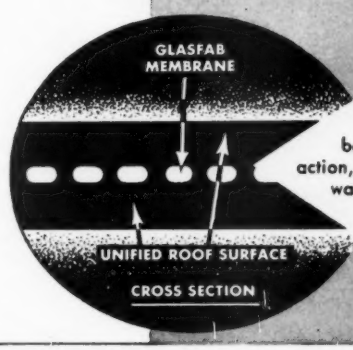
GLASFAB'S "BUILT-IN HOLES" KEEP ROOFS WATER-TIGHT LONGER!



Old-style membranes are felt-type or tightly woven fabrics which roof coatings cannot penetrate. Result: "sandwich-type" surfaces vulnerable to early failure and leakage.



BUT —look at Glasfab's open-mesh weave. This permits penetration of roof coating, which locks membrane in unified surface and bonds tightly to old roof.



Glasfab's "built-in holes" assure better reinforcing action, thus produce a waterproof surface with greater strength and longer life.

● You can cut roof maintenance costs . . . and get longer-lasting protection against damaging leaks by using Glasfab, the fiber glass roofing membrane.

Preferred by architects and contractors since its introduction in 1947, Glasfab is the performance-tested answer for repairing or resurfacing industrial plant roofs.

Glasfab does what a membrane is supposed to do—it provides a virtually indestructible reinforcement for roofing compounds. Glasfab is much stronger than cotton, felt or other *organic* fabrics . . . and unlike these conventional membranes, can't rot, decay, char, burn or become brittle. Glasfab produces a flexible roof surface five times as tough as with felt, thus stays water-tight under damaging roof traffic.

Glasfab cuts roof maintenance costs three ways: (1) Glasfab costs less than most inferior organic membranes, (2) Glasfab reduces installation labor costs up to 50% and (3) Glasfab guarantees a lower *lifetime* cost with fewer repairs or replacements due to membrane failure.

Your own maintenance crew or your roofing contractor can install Glasfab. It comes in light, easy-to-handle rolls that weigh only 17 pounds, cover 1150 sq. ft. Smaller rolls are available for small jobs. And applying it with cold coatings (either emulsion or cut-back asphalt) is simple and fool-proof.

Whatever your topside repair problem— flashings, copings, parapets, or the roof surface itself—you will get better results at less cost with Glasfab . . . it's "*tops for topside protection*".

TWINSBURG-MILLER CORPORATION
P. O. BOX 207 • TWINSBURG, OHIO

THE MODERN FIBER GLASS ROOFING MEMBRANE

GLASFAB

Tops for Topside Protection

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☐ Please send sample of Glasfab.

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Address:_____

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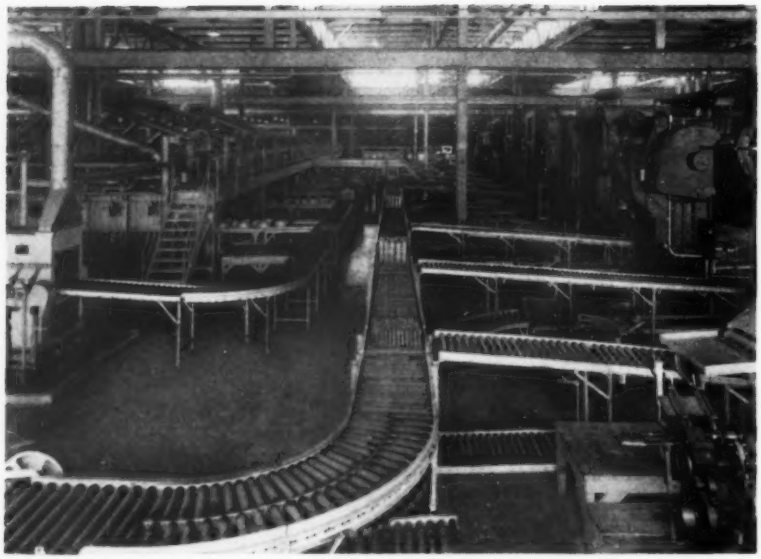
For more facts circle 602 on Reply Card

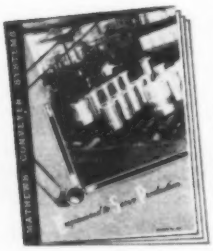


ROLLER CONVEYERS

ONE OF THE MANY TYPES OF HIGH-QUALITY POWER AND GRAVITY CONVEYERS IN THE MATHEWS LINE

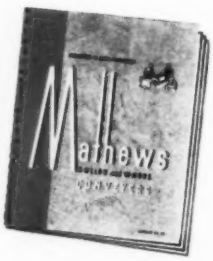
● Whatever the package you are handling — whether its weight is measured in pounds or tons — there is a Mathews Roller Conveyer of the right capacity to handle it.

With a range of roller sizes reaching from 1" to 6½" and capacities from 50 pounds to 16,000 pounds, the Mathews Roller Conveyer line is complete. That's why we say, "If it's a roller conveyer job, it's a natural for Mathews engineers."



★

Write for Catalog No. 151 for complete details of roller and wheel conveyers, and for Catalog No. 853 which features numerous installations that might help with your conveying problems. Both are yours for the asking.



MATHEWS CONVEYERS

GENERAL OFFICES . . . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIVISION . . *Mathews Conveyer Company West Coast*
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CANADIAN DIVISION . . . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

For more facts circle 603 on Reply Card

NEW PRODUCTS

(Begins on page 130)

fered—light bodied for precision threads and viscous for manual application. Both are declared suitable for all chemicals to which Teflon is inert and for temperatures to 400 F. The compound comes in 2-oz jars and 8-oz cans, cost $1.00 per ounce. Company says it's economical—2 oz will seal 30 to 40 joints in 1-in. pipe. Eco Engineering Co.

40—WELDING torches are available in two types

The Airco 400 is designed for light welding and brazing operations, such as light fabrication and repair jobs. This torch is 5-¾-in. long, weighs but 6 oz., and has a corn-cob handle for a firm grip. A cutting attachment is available which adapts torch for occasional cutting jobs.

The Airco 300 is a compact, lightweight torch intended primarily for oxyacetylene burning or welding of lead products, as sheet, pipe and storage battery parts; but it is also suited for soldering and light production welding. It weighs 5 oz and is 2½-in. long. Both torches have ball-type oxygen and acetylene valves positioned for easy thumb adjustment. A variety of tips, mixers and extensions are available. Form ADC 721 gives detailed information on these torches. Air Reduction Sales Co.

41—WIPING CLOTHS, of nonwoven fabric; washable

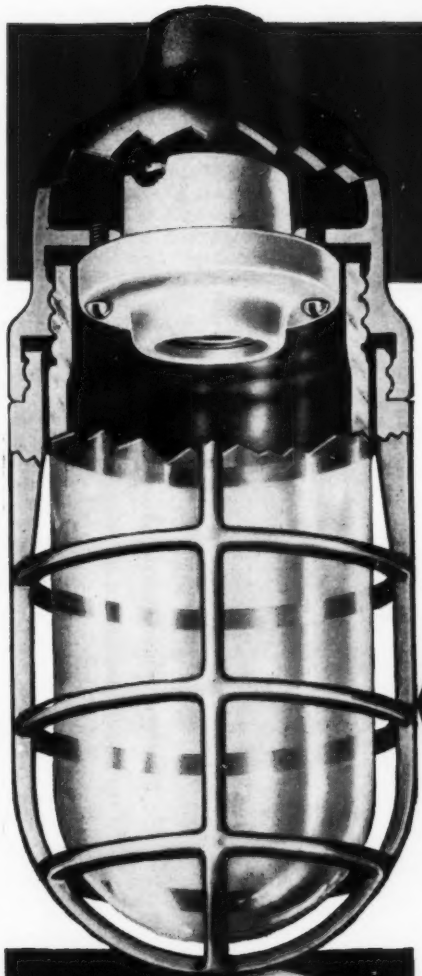
Now available in industrial sizes, Wilson Wipes are described as highly absorbent, yet having a higher wet strength than paper towels. They can be washed and used again, company says, but their low cost makes them economical enough to discard after being used once. The towels come in sizes 12 by 14 in. and 12 by 18 in. Wilson Wiping Cloth Co.

42—INDICATING LIGHTS are oil tight, heavy duty

New heavy-duty oil-tight indicating lights for this company's line of oil-tight pushbuttons, selector switches, and accessory controls have all-glass faceted lenses factory-sealed to metal caps and feature all-angle visibility. They are available in red, green, white, blue, amber and clear. For versatility and easy installation, the lights are designed for both front and back mountings. They are available in three forms—resistor, transformer, and full-voltage—and are rated from 110 to 600 v with a 10-amp continuous rating. General Electric Co.

43—STEEL CASTER is non-locking, easy starting

This steel caster is claimed not to lock or jam in any position, even under maximum load. It is also said to require less effort to start, to roll, turn, and pivot easier, and take the bumps and rough surface floors with less vibration and shock. The caster has a curved axle with



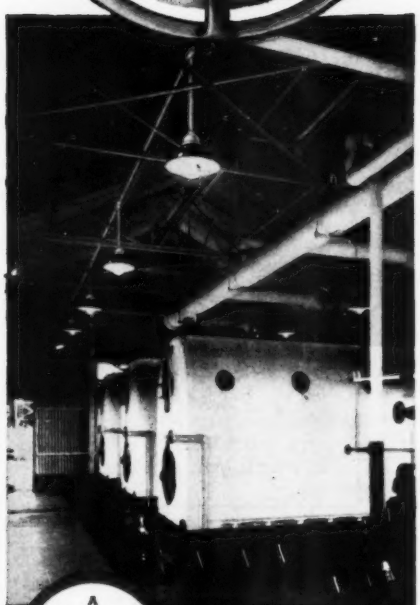
CROUSE-HINDS

Vaportight

Industrial Lighting Fixtures

For use in boiler rooms, powerhouses, shower rooms, tunnels, loading docks, building entrances, and all indoor and outdoor locations where exposed to moisture and rain, non-explosive vapors and gases, or non-combustible dusts.

1. **Vaportight** and raintight.
2. **Wiring chamber** remains vaportight even though globe is off.
3. **Porcelain Receptacle.**
4. **Screw guard** or clamp guard.
5. **11 Hub** arrangements.
6. **4 Reflector** styles.
7. **Accessories:** Colored globes, pear-shaped globes and guards, half shades, and adapters.
8. **4 Sizes:** 50 through 500-Watt.



Vaportight lighting fixtures are available for attaching to several round-base Condulets and sheet steel outlet boxes. Crouse-Hinds complete *Vaportight* line includes hand lamps, switches, plug receptacles, and other electrical devices.

Complete listings in the Condulet Catalog.

A Nationwide Distribution Through Electrical Wholesalers

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For more facts circle 604 on Reply Card

Does Your Plant Have Lines Carrying Corrosive Liquids ?

Then You Should Know About

Rockwell-Nordstrom *Valves*

Rockwell-Nordstrom valves resist corrosion better than other valves because the vital seating area of a Rockwell-Nordstrom valve is never exposed to the line fluid. A thin film of lubricant covers the entire seating surface preventing corrosive fluids from acting upon this critical area.

In addition, Rockwell-Nordstrom valves are manufactured in a wide range of special corrosion-resistant metals.

For longer life and trouble-free valve operation, install corrosion-resistant Rockwell-Nordstrom valves at your plant.

There's a new bulletin prepared by Rockwell Manufacturing Company describing corrosion-resistant valves for industrial services. Mail the coupon below for your free copy today!
Rockwell Manufacturing Company, Pittsburgh 8, Pa.

Rockwell-Nordstrom Valves

Lubricant-Sealed for Positive Shut-Off

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Peacock Brothers Limited.

ROCKWELL MANUFACTURING COMPANY 5432A
Pittsburgh 8, Pa.

Please send me Rockwell-Nordstrom Valve Catalog V-217.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

For more facts circle 605 on Reply Card

NEW PRODUCTS

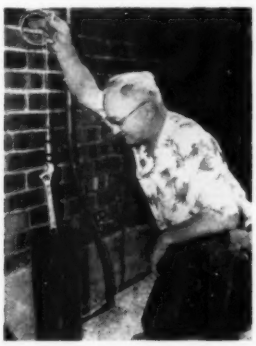
(Begins on page 130)

dual ball bearing sockets. Manufacturer says it requires no maintenance, won't pick up dirt or lint, and has a rust-resistant finish. It is made of alloy steel and available in standard 1½ and 2½-in. wheel diameters with welded or screw type bearing plate. Load specifications are available. Rolawheel Co.

44—SMALL MAGNET serves as handy recovery tool

This powerful little 4½-in. magnet may be used as recovery tool for parts or spilled pieces of metal. The Recovery Magnet is made of Alnico V; it is contained in a 1-in. non-magnetic stainless steel tube. A non-removable mild steel tapered plug is on the attracting end of the tube to provide sinking weight, while on the other end is a captive ⅛ in. standard pipe nipple drilled with a $\frac{7}{64}$-in hole.

The hole allows a rope or wire to be passed through it so the whole magnet

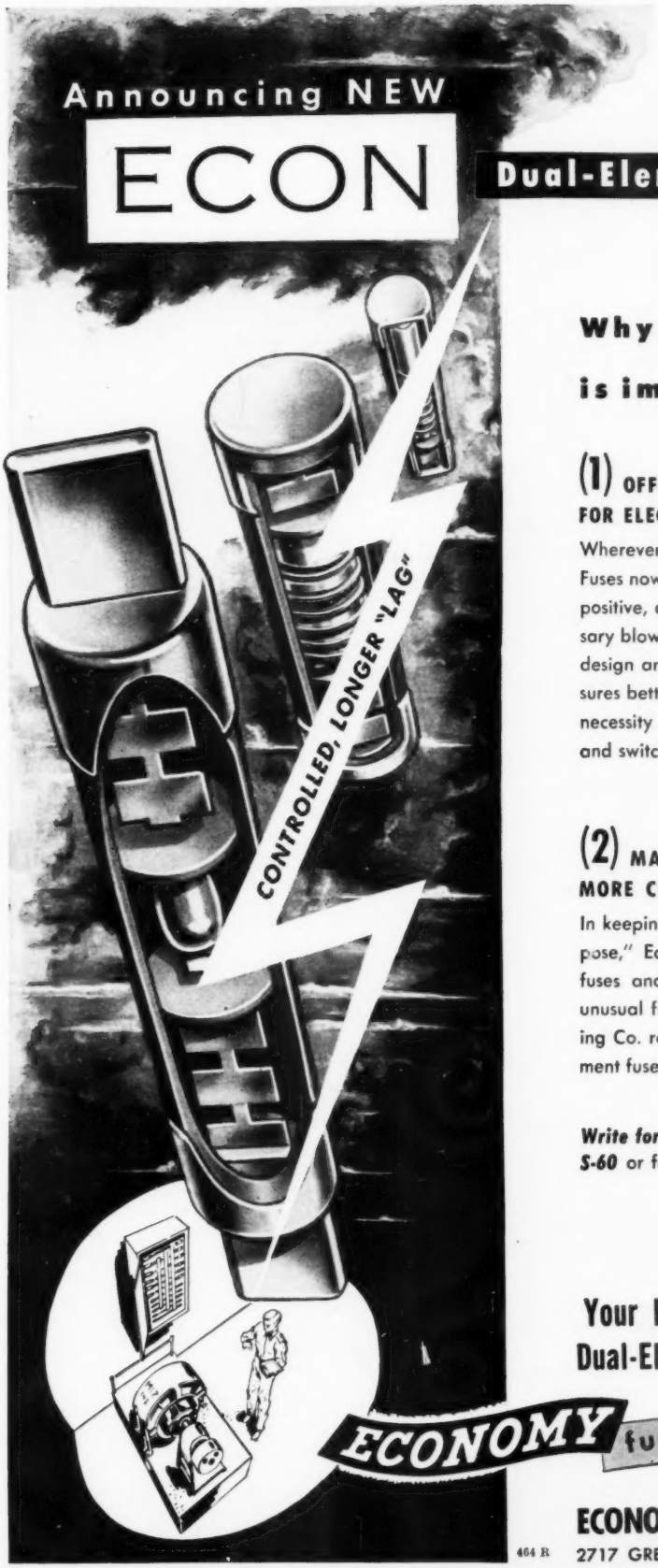


can be lowered into vertical pipes, in water, tanks. A coupling or reducer can attach any length pipe to the nipple and the magnet can be shoved into places where simple gravity won't carry it. In steel pipes the magnetic attraction of the tool to the pipe walls is prevented by a feature incorporating two removable Neoprene rings which slip around the recovery tube. The unit is priced at less than $12. Eriez Mfg. Co.

Use the Reader Service Cards on pages 37-38 and 187-188 to ask for more information on these products. Circle item number of products in which you are interested.

45—PORTABLE HEATER is versatile, oil-fired unit

Many jobs—from providing quick heat on winter construction jobs to tying in with a heating system to supply emergency warmth during a furnace repair—can be handled by this heater. Its oil consumption is said to be low, and heat is distributed by an electrically operated



Dual-Element Cartridge FUSES

Why this announcement is important to YOU:

(1) OFFERS GREATER PROTECTION FOR ELECTRICAL CIRCUITS

Wherever overloads are likely to occur, ECON Dual-Element Fuses now bring the time and money savings that result from positive, dependable controlled protection against unnecessary blowouts — as well as against short circuits. The unique design and construction of the ECON Dual-Element also insures better protection against single-phasing, eliminates the necessity of over-fusing, and results in cooler fuse holders and switches.

(2) MAKES THE ECONOMY LINE MORE COMPLETE THAN EVER

In keeping with the policy of offering "Fuses for Every Purpose," Economy is constantly adding new and improved fuses and other circuit-protection products to help solve unusual fuse problems. Thus, Economy Fuse & Manufacturing Co. rounds out its line still further with a new dual-element fuse that offers many special features and advantages.

Write for New ECON Dual-Element Cartridge Fuse Catalog, S-60 or for literature on other type fuses.

Your Electrical Wholesaler has ECON Dual-Element Cartridge Fuses in stock

ECONOMY fuses for every purpose

ECONOMY FUSE & MANUFACTURING CO.

404 R 2717 GREENVIEW AVE. • CHICAGO 14, ILLINOIS

For more facts circle 606 on Reply Card

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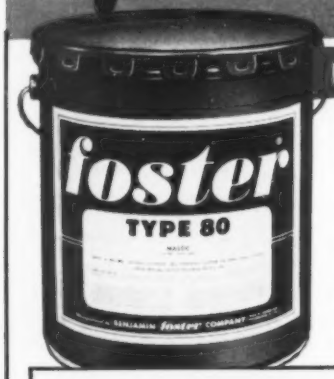
and the Only One!



FOSTER'S TYPE 80 MASTIC

the first and only Mastic with the UNDERWRITERS' LABORATORIES *label classification: as to* FLAME SPREAD • FUEL CONTRIBUTION *and* SMOKE DEVELOPED

Safety Engineers. Chemical Engineers. Plant Maintenance Superintendents. Architects and many other top-flight executives have wanted this: a Mastic that gave complete protection against corrosion, rust and weathering

Plus

providing a dependable moisture vapor barrier

Plus

an UNDERWRITERS' LABORATORIES listing of classification...

and here it is!

FOSTER'S TYPE 80 MASTIC

There's plenty more to be said about the outstanding features of this Fire-Resistive TYPE 80 MASTIC... all yours, for the asking.

Contact our nearest representative (we have National Representation) or write to our Manufacturing and General Offices.

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The Benjamin **foster** Company

4635 W. Girard Ave., Phila. 31, Pa.

For more facts circle 607 on Reply Card

NEW PRODUCTS

(Begins on page 130)

blower fan at the output end of the heater. It can be wheeled from one location to another. The combustion chamber is stainless steel; aluminized steel is used for the heat exchanger. Lennox Furnace Co.

46—SOUND ABSORBERS for low cost noise reduction

A new approach to the problem of industrial noise by the use of small, portable, and easily installed sound absorbing units is announced. Known as Sonosorbers, the units have inner cores encased in perforated stucco embossed aluminum. They weigh about 2½ lb each, are described as

non-flammable and easy to clean. They are suggested for locations where other acoustical treatment is not applicable or adequate.

According to company engineers, Sonosorbers have high value of noise absorption in both high and low frequencies —they are volume absorbers with absorption areas larger than their physical dimensions in certain frequencies. In an intense sound area, their physical structure tends to break up sound waves, it is explained, to attract and absorb or drain the sound due to diffraction. Sonosorbers are about 24 in. long, and are hung on 2-, 4-, 6- or 8-ft centers or as desired. It is pointed out that their use does not necessitate alteration or moving of sprinklers, lighting fixtures, skylights or ventilating equipment. Sonosorber Corp.

47—STRONG CEMENT for bonding the nylon parts

Nylaweld is a new type of cement developed to meet the need for a tough, non-brittle bond between pieces of Fm-10001 nylon. It is described as a liquid chemical mixture that produces practically invisible joints. Its high fluidity permits rapid coating by dipping, brushing, spreading or spraying, it is pointed out, and a plasticising action makes the joints non-brittle.

Nylaweld bonds are said not to degrade under prolonged exposure to boiling water or boiling concentrated aqueous alkali solutions. Tensile strengths only slightly less than the strength of the material itself can be achieved by curing to specifications, says manufacturer, the tensile strengths varying from 5000 to more than 10,000 psi, depending on procedures.

According to manufacturer, use of Nylaweld increases design flexibility while

. . . there's a

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That's right! No matter where you're located—at Times Square or Twin Forks—there's a Black & Decker Service Branch within 24 hours of you, completely equipped to give you expert, economical repair work or preventive maintenance on your B&D Tools!

What's more, this nationwide network of B&D Service Branches is company-owned-and-operated, not small repair shops "licensed" by a manufacturer. They offer you factory-trained mechanics and genuine replacement parts. They interpret our Service Policy and Guarantee to your best interest, because they're operated for your convenience and satisfaction!

Check your B&D Tools now! Send those in need of service to your nearest B&D Service Branch, and they'll soon be back on the job with all their original power, speed and accuracy! THE BLACK & DECKER MFG. CO., 611 Pennsylvania Ave., Towson 4, Maryland.

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Cincinnati 2, O.
Cleveland 15, O.
Dallas 7, Tex.
Denver 4, Col.
Des Moines 12, Iowa
Detroit 2, Mich.
Houston 3, Tex.
Indianapolis 2, Ind.
Kansas City 8, Mo.
Los Angeles 7, Calif.
Louisville 9, Ky.
Memphis 6, Tenn.
Miami 37, Fla.
Milwaukee 13, Wisc.
Minneapolis 8, Minn.
Newark 5, N. J.
New Orleans 12, La.
New York 13, N. Y.
Oklahoma City 6, Okla.
Omaha 2, Neb.
Philadelphia 3, Pa.
Pittsburgh 13, Pa.
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San Francisco 24, Calif.
Seattle 9, Wash.
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For address of nearest branch see "Tools-Electric"

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Black & Decker PORTABLE ELECTRIC TOOLS

WORLD'S LARGEST, MOST COMPLETE LINE

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3-WAY COST CUTTER

To solve the problem of getting difficult lifting and handling jobs done faster and cheaper, a mobile, high capacity Bucyrus-Erie crawler crane will cut costs three ways:

LESS EXTRA EQUIPMENT — Easy to handle, maneuverable Bucyrus-Eries travel to any job in the plant area wherever and whenever needed. No need for multiple stationary cranes or large yard crews.

IMPROVED SPACE UTILIZATION — When you can't spread out, go up. These cranes have long booms to stack material to any desired height . . . to reach into hard-to-get-at places.

FASTER, SAFER HANDLING — Wide square mountings give stability to swing heavy lifts fast and accurately. With the load power controlled by the engine, it's simple to ease it into position.

Clip, fill in, and mail the coupon today for the full story on how you can keep materials moving more efficiently between warehouse, yard, or factory the Bucyrus-Erie way.

BUCYRUS-ERIE CO.

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BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

BUCYRUS ERIE

Gentlemen:

I'm interested in the application of Bucyrus-Erie cranes to materials handling. Send me literature.

Name _____

Company _____ Title _____

City _____ Zone _____ State _____

49E53

For more facts circle 609 on Reply Card

NEW PRODUCTS

(Begins on page 130)

simplifying the fabrication of complicated parts. It is also possible, with this cement, to form and test a part prototype before investing in dies or molds. The cement is supplied in pint, quart and gallon cans—a gallon costs about $18.00. The Polymer Corp. of Pennsylvania.

48—FLOOR COATING IS non-skid, corrosion resistant

NeoFloor is announced as a new, economical and easily applied skid-proof surface coating for concrete, wood and metal floors. Developed for use where oils, greases and chemicals create safety hazards and maintenance problems, NeoFloor is claimed to provide safe, comfortable footing and long lasting surfaces which can stand up under heavy traffic and heat aging.

As described by manufacturer, NeoFloor is a tough, tightly bonded material which is resistant to fumes, spillage from acids, alkalis, salt solutions and solvents at temperatures to 220 F. It is said to be waterproof, impervious to oils and greases, and cleanable with commercial detergents and cleaners. Pennsylvania Salt Mfg. Co.

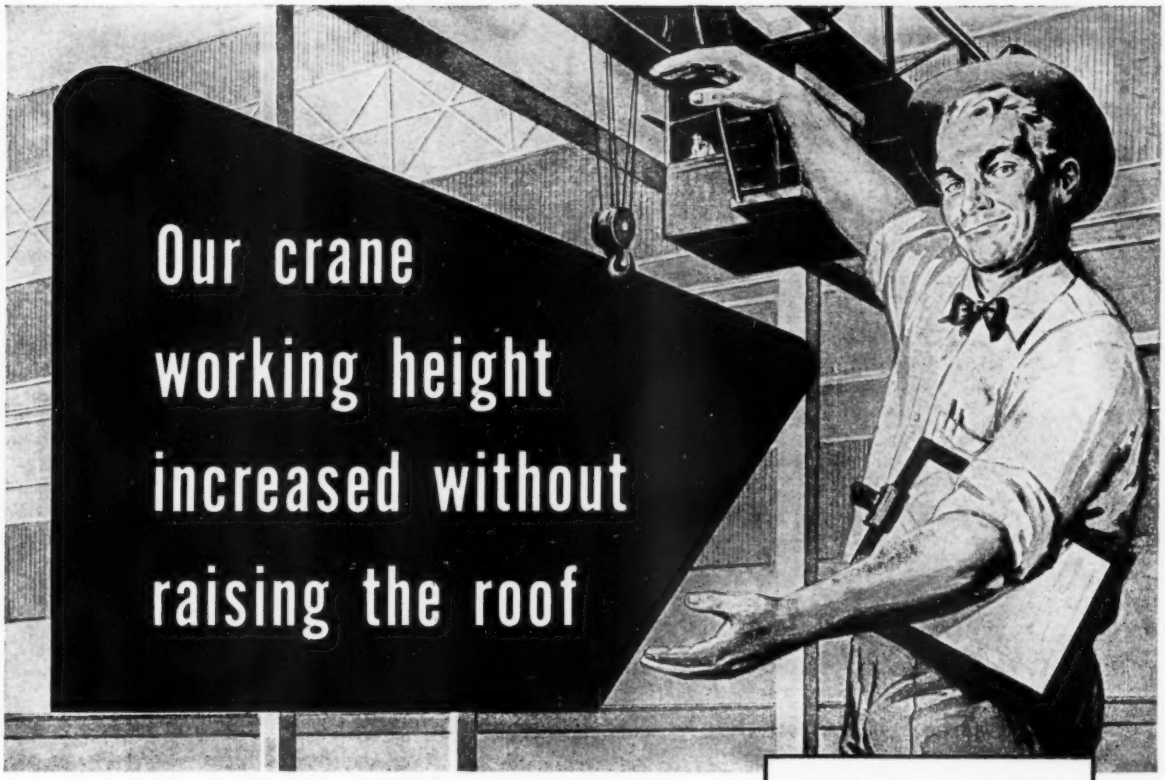
49—MAGNET WIRE for "hottest spot" temperatures

Intended for use in electrical equipment operating at "hottest spot" temperatures of at least 130 C, this new silicone enameled magnet wire is said to have good abrasion resistance. It adheres well to the conductor, is smooth, tough and not attacked by common solvents, says manufacturer, and the enamel will not craze when exposed to solvents or crack when exposed to low temperatures. Dielectric strength is given as 1500 v per mil. Wires insulated with the new enamel are furnished in single and heavy grades. Anaconda Wire & Cable Co.

50—TIME SYSTEM compensates for power interruptions

Compensation for prolonged power interruptions due to electrical storms or shutdowns for maintenance and repairs is a feature announced for this 12-hour self-regulating electronic time system. Its extended range of correction is provided twice each day for all indicating clocks that have fallen behind more than an hour, making it possible to correct automatically clocks with time lags of as much as 11 hr, 59 min, and 5 sec. Time lags of 59 min or less, or fast errors of up to 55 sec, are supervised hourly and corrected in 1 min, as in company's other time systems. Units showing correct time remain unaffected by hourly or 12-hourly supervisory signals, it is noted.

Manufacturer points out that because this system requires no special clocks and signal wiring, installation costs are nominal and it can be expanded and relocated. International Business Machines Corp.

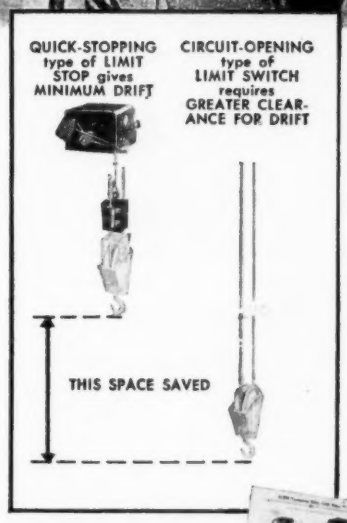


WITH EC&M YOUNGSTOWN SAFETY LIMIT STOPS

"We frequently needed more headroom on our D-c cranes. The limit stop setting couldn't be raised without sacrificing the clearance needed by the hoist-brake to safely stop the fast-moving empty hook, which hoists 2½ to 3 times faster than when hoisting full load. We had a choice . . . we could raise the roof . . . which meant deeper footings, heavier building columns and increased costs for lighting, heating and ventilating . . . OR . . . we could equip our cranes with **quick-stopping** EC&M Youngstown Safety Limit Stops."

Yes, Youngstown Hoist Limit Stops not only disconnect power from the motor but also apply **dynamic braking** to aid the hoist-brake in a **quick stop** . . . giving less drift . . . more headroom. **Safe,** too, because the tripping point does not change . . . is not affected by stretching of the hoist cables. The point at which the rising crane-hook makes contact to lift the Youngstown suspended-weight always remains the same.

For increased D-c crane headroom, **plus safety,** investigate EC&M Youngstown Safety Limit Stops.


QUICK-STOPPING type of LIMIT STOP gives MINIMUM DRIFT
CIRCUIT-OPENING type of LIMIT SWITCH requires GREATER CLEARANCE FOR DRIFT
THIS SPACE SAVED

Write today for Bulletin 1032 which describes and illustrates EC&M Youngstown Limit Stops.

3775

YOU CAN LIFT LOADS HIGHER AND SAFER WITH EC&M YOUNGSTOWN SAFETY LIMIT STOPS

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

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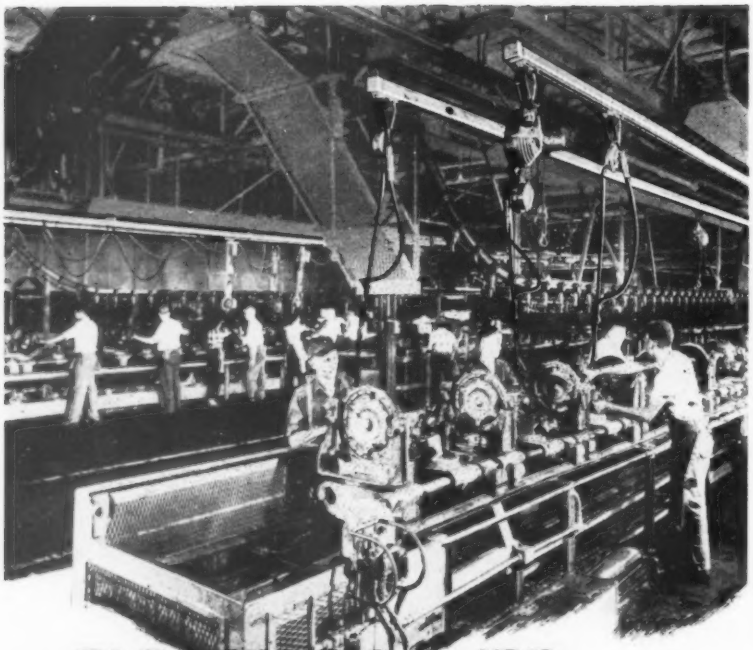

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Installed over work areas, FEEDRAIL provides a continuous, uninterrupted source of electric power. Through its easy rolling trolley outlets, the power can be brought to the work — or move right along with it. Any tool or machine used on an assembly line can be powered by FEEDRAIL. If new tools are put into service, additional trolley outlets can be quickly and easily inserted in the track without shutting down power — and without interrupting work in process.

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GET THE FULL CONVINCING DETAILS . . .
Descriptive literature showing how FEEDRAIL can be applied to your own requirements is yours for the asking. Write Dept. P-4.

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SPECIALLY QUALIFIED REPRESENTATIVES IN PRINCIPAL CITIES

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Color Coding Grinding Wheels

(Continued from page 113)

on the exterior are that it protects the wooden core against ingress of moisture and wet concrete, thus extending the life of the core. It holds the core together as a single unit for ease of assembly. When the wooden core has been extracted from the hole, the rubber sheathing can be collapsed inward and extracted easily; it is for this reason that the sheathing should be thin.

Core extraction can be by means of the lever stand, illustrated in Fig. 1 and repeated in Fig. 2, the bar end in this case engaging with a strong loop attached by means of wood screws to the wedge. A screw-in eye-bolt can be used for small diameter cores and has the advantage that the former can be flush with the top surface of the floor so that there are no projections over which workmen can stumble. The eye-bolt is screwed into the wedge only when it is time to remove the core.

Salvage Systems Must Salvage

(Continued from page 107)

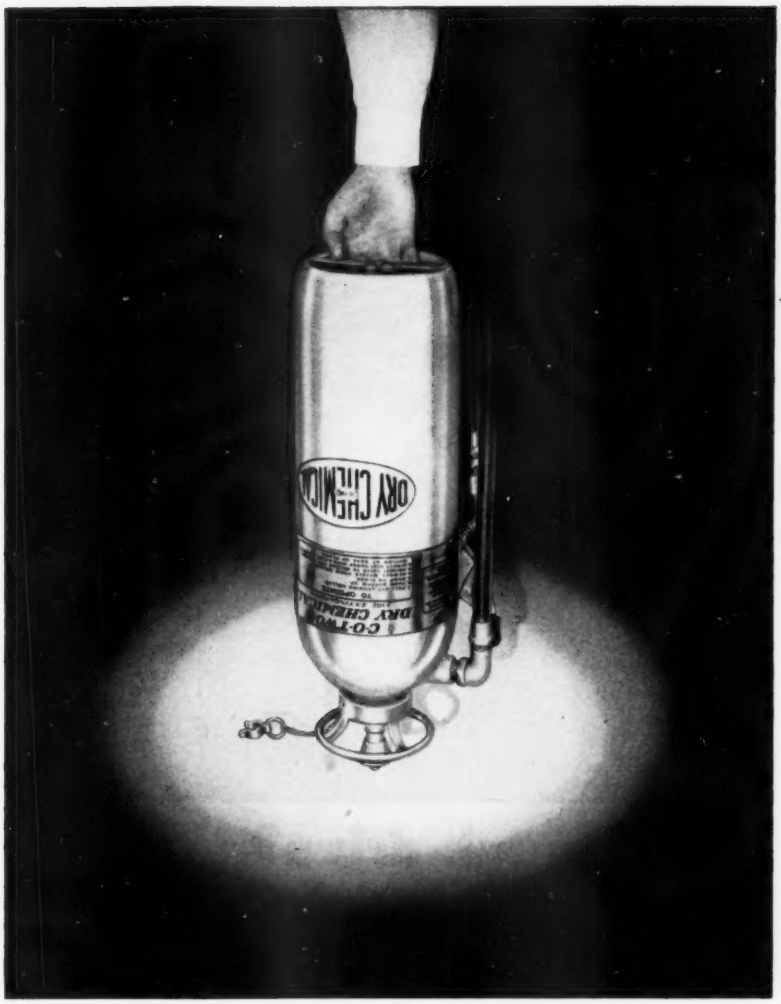
people to get their cooperation and goodwill. The Salvage Supervisor must be fair, patient, and enthusiastic about his job. If he can enthuse supervisors and workers with that same warm interest, his work will be greatly simplified. A little praise distributed here and there reaps far more benefits than excessive criticism.

A Salvage Supervisor should have complete charge of the collection, segregation and disposal of all scrap, waste and surplus items. He must be advised of the changes in productive processes in the interest of conservation. He must expertly guide the work of the employees in his own department—sorters, spark testers and stock men; he must keep the necessary records; and he must direct the re-work of material, supplies and tools for re-use.

The Salvage Department must control all obsolete and scrap material taken off company property. The signature of the Salvage Supervisor or his foremen should be all that is necessary to remove anything from the premises.

The question is often raised as to why the Salvage Department should control such disposal. Obviously, salvage can be sold on the outside, scrapped, or made available to employees. As an example, such items as scrap lumber, cans, small obsolete tools, used furniture, etc., sold or given employees, can be an important

Bump that assures positive results



When fire strikes, seconds count . . . your fire extinguishers must be the right type and function properly from the very start . . . failure means serious losses.

The growing popularity of the highly effective powdered dry chemical fire extinguishing agent may be hampered by a drawback . . . settling or packing can occur after a lapse of time. However, with C-O-TWO Dry Chemical Type Fire Extinguishers there's no chance of this happening.

The exclusive inverting and bumping design of C-O-TWO Dry Chemical Type Fire Extinguishers provides mechanical breakage of the dry chemical by shifting its position in the cylinder. This outstanding mechanical breakage, plus continuous inert gas pressured agitation or fluffing of the skillfully blended free flowing dry chemical, guarantee lasting, foolproof fire protection.

No other brand on the market today gives you this extra margin for positive results. Inverting and bumping is only one of many unique design advantages that make C-O-TWO Dry Chemical Type Fire Extinguishers your best buy for killing flammable liquid and electrical fires, as well as surface fires involving ordinary combustible materials.

With C-O-TWO Dry Chemical Type Fire Extinguishers the heat-shielding dry chemical is a non-conducting, non-abrasive, non-toxic, finely pulverized powder compound . . . blankets fire instantly. Sizes range all the way from 4 to 150 pounds capacity . . . all fully approved by the Underwriters' Laboratories, Inc., Factory Mutual Laboratories and Government Bureaus.

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Tannate has proved itself for economy and efficiency on some of the toughest drives in industry today. It can do the same for you in your plant.

Our modern production facilities, in addition to the wealth of belting know-how gained during the past 250 years in business is your assurance of a good, reliable source of supply. And, if you need it, technical assistance is available from our Engineers, specializing in mechanical power transmission. We are prepared to offer assistance from the design phase to on-the-job results.

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factor toward employee-management goodwill. The determining factor as to whether employees pay for salvage or not, is whether such material could be sold. If there is value in the item, the employee is charged with the market price.

The small amount of time necessary in taking care of such disbursements is more than made up by the goodwill created.

At our Division, organized responsibilities are as follows: When the product or material must be sent outside the plant to vendors, for processing, the Supervisor of Salvage is responsible to the Manager of Purchases. The same is true for obsolete items to be sold on the outside.

Where salvage is to be reworked within the plant, for use within the plant, the Supervisor of Salvage reports to the General Superintendent. At the same time, however, he often consults with various department heads to see if certain ideas are practical. It may be that an idea for salvaging is not feasible, that it will be more practical to sell rather than salvage.

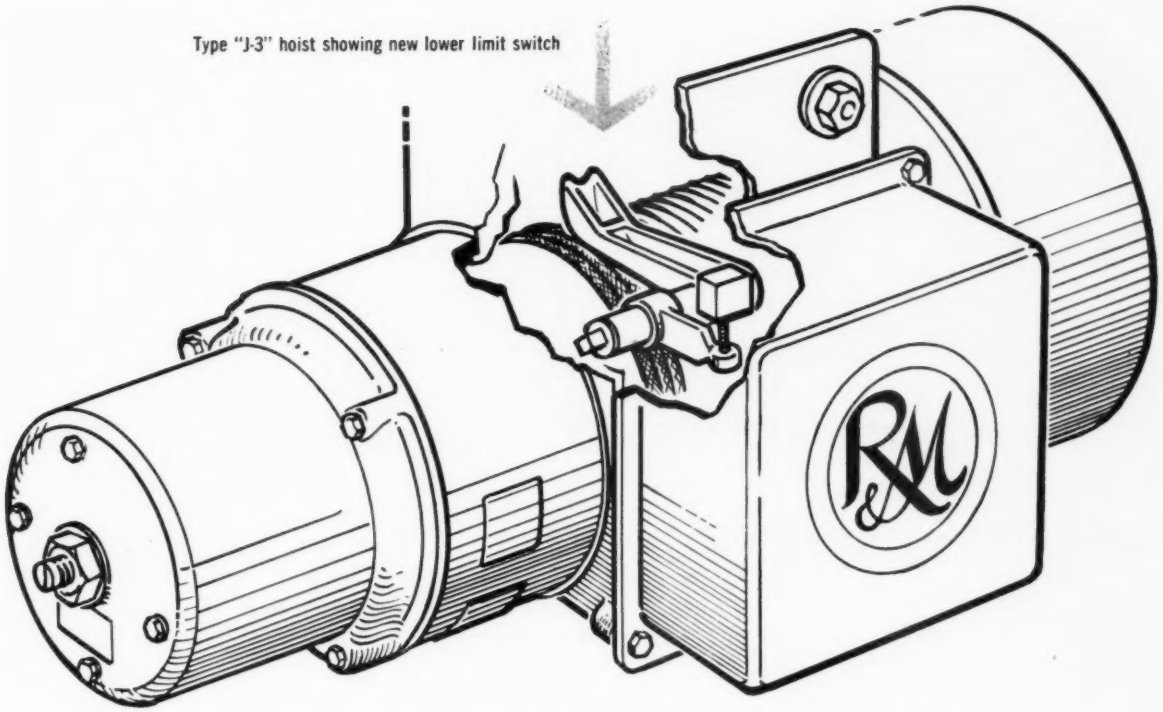
For example, if the cost in salvaging a part is greater than 50 per cent of its original purchase price, it is now our policy to sell rather than attempt to salvage. We found this procedure profitable. The one major exception is where lengthy delivery of a new item

"Always little jobs—why doesn't something big breakdown so that they can find out what a good repairman I am."

would necessitate a shutdown, or a similar costly delay.

Without proper accounting records, it is impossible to determine whether the Salvage Department is a losing or paying venture. The development of a good system of accounts in connection with the Salvage Department leads to a closer analysis of scrap losses and waste in general. Periodical reports to management are also

Type "J-3" hoist showing new lower limit switch



new

HELP FOR YOUR LIFTING PROBLEMS

That's the Robbins & Myers J-3 electric cable hoist, new from trolley to hook block. Designed to provide maximum economy for your investment, the J-3 fills the gap between lower cost electric chain hoists and costlier heavy-duty models. It's field proven and backed by R&M's reputation for quality. Buy the J-3 for those two-ton handling jobs for which you've wanted the advantages of an electric cable hoist.

Check these features—new lower limit switch leaves two wraps of cable still on the drum, never lets the load hang from the cable anchorage—heat treated alloy steel helical and straight spur gears—machine grooved drum allows 18-foot lift without overwind—cast aluminum alloy frame—anti-friction bearings throughout—two horsepower high torque R&M hoist motor— Weston-type load brake—magnetic disc motor brake—single speed push button control is standard, two speed available—lug mounting, or plain, geared, or motor driven trolley—2000 or 4000 pound capacity models.

Now you can buy a two-ton cable hoist for as little as $725.00!

take it up with

ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO | BRANTFORD, ONT.

VENTILATORS MOYNO PUMPS HOISTS CRANES MOTORS FANS

clip
staple to letterhead
add name & title

Have representative call ☐

Send J-3 bulletin No. 890 ☐

PLANT ENGINEERING

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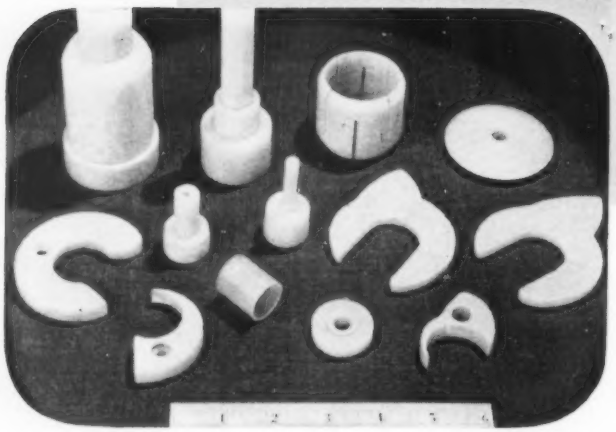

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very important to keep policy-makers informed on those matters which affect the profit and loss position of the company.

These are the main procedures we follow in our salvage operations. The importance of the original set-up of the program and the continuous follow-through cannot be overemphasized. Remember, even though management is sold initially on salvage, they must be continuously sold through instructive progress reports. And second, the men within the plant must understand the reasons behind the salvage program and must be continuously reminded of its merits. At no time can this effort be relaxed. Proper procedures plus effective education are the basic ingredients of important savings for any company. For the Axle Division, savings through Salvage meant a profit of more than $40,000 in 1952. Proportionate savings like these can be yours, too.

New NEMA Standard Motors

(Continued from page 101)

The significant mounting dimensions of type C face mounted motors for both old and new lines are shown in Table III. The most critical dimension as far as interchangeability is concerned is the flange diameter, "AK." A quick check of the table shows that five of the eleven ratings have the same flange diameter in both lines. In the other six ratings, "AK" is smaller as shown in column "△AK."

A dimension that is allied to "AK" and is also very important is "AJ," which determines placement of the mounting holes. This is the same for both standards whenever "AK" is the same, but at no other time. Therefore, in six of the eleven ratings, the dimension "AJ" is less by the amounts indicated in column "△AJ."

It should be noted that the relation of "AJ" to "AK" has been changed in 182UC and 184UC frames. In the old motors, "AK" was always greater than "AJ," but in the new motors this condition has been reversed for the first two frame sizes—182UC and 184UC.

No minor adjustments can be made in mounting type C face mounted motors to ease the difficulties in interchangeability. New mountings will be required in all cases.

The "BB," "BD," and "BF" hole dimensions are the same in both lines when the "AK" dimension is unchanged.

The other dimensions of interest in type C face mounted motors pertain to the shafts. Very often users of face mounted motors specify special shafts

Moving 4,000,000 lbs. a day a distance of 1,500 ft. Mercury HUSKIE Gas Tractor pulling a fully loaded Mercury "Trackless Train" of Type A-310 Trailers.

"Trackless Train" solves major handling problem at Louisiana sugar refining plant

American Sugar Refining Company of Arabi, Louisiana, moves packaged sugar from plant to dockside faster and at *lowest cost per ton-mile* with the Mercury "Trackless Train" method of horizontal material handling. Multiple loading and unloading of freight cars (formerly used) is eliminated.

Major operating advantages of the "Trackless Train": 1. Loads are always on wheels . . . readily movable by hand for short distances.

Unit loading the "Trackless Train"

2. The train is not confined to any fixed path . . . can go anywhere that the movement necessitates. 3. Trailers can be suited to the materials to be moved. 4. Material movement can be systematized and tied into production schedules by planning regular routes . . . dispatching trains at stated intervals . . . and centralizing control. Learn how the Mercury "Trackless Train" can speed material movement and lower cost in your plant. Write today.

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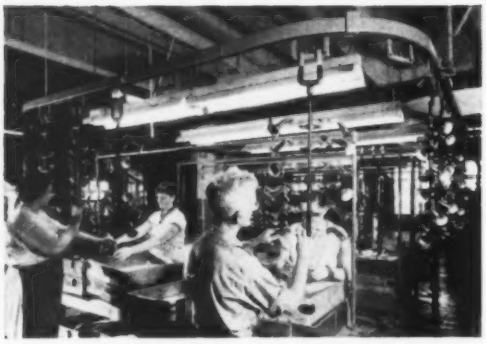
Increases production, cuts rejects on plating line with **R-W "Zig-Zag"®**

Continuous Power Conveyors



The Speakman Company, Wilmington, Delaware, faced with the problems of lowering costs and increasing production of chrome-plated plumbing fixtures, chose Richards-Wilcox "ZIG-ZAG" Continuous Power Conveyor to increase the efficiency of their plating line.

"ZIG-ZAG" Conveyors operate overhead —out of the way of production. Exceptionally flexible, they move up, down, in, out and around . . . carrying unit loads up to 125 pounds at varying speeds from one inch to sixty feet per minute. Six-inch carrier pendant centers make it an easy matter to adapt "ZIG-ZAG" to changing production requirements. The system may be easily altered or relocated by plant personnel, usually using all the parts.

"ZIG-ZAG" Conveyors are quality designed and manufactured. They offer longer, safer, more efficient service on any production line. Find out how "ZIG-ZAG" Conveyors can help *you* meet increased demand.

For complete details, consult an R-W Engineer—at no obligation!

Plating line at the Speakman Company showing R-W "ZIG-ZAG" Conveyor in action. Conveyor installation by Hanson-Van Winkle-Munning Co., Matawan, N. J.

1880 RICHARDS WILCOX R&W AURORA Reg. U. S. Pat. Off. 1954

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to fit the machines they are to drive. It is presumed that the rerate program will not affect this practice. For users of standard shafts, there will be changes in shaft diameter and shaft extensions.

Changes in shaft diameter, "U," for type C face mounted motors using standard shafts will be the same as those for foot mounted motors stated earlier. As before, in seven of the 11 cases being discussed, adjustments will have to be made. Those cases which have the same "U" dimension in both lines also have the same "AK" dimension in both lines.

Shaft extensions, dimension "AH," have been shortened in nine of the 11 cases.

Although the "BC" dimension differs between the new and old motors in eight of the 11 ratings, the variations serve to make the new motors more generally usable than the old. As Table III indicates, the changes have been from a positive to a negative value of "BC." Such changes should provide better shaft seal.

There is one other type of motor mounting that should be considered here—the type D flange mounted motor. The significant mounting dimensions for this type motor of both the old and new lines are shown in Table IV.

Except for shaft dimensions, the mounting dimensions for the particular ratings being considered are the same for the new line as for the old in 10 of the 11 ratings listed. Only in the case of the 20 hp motor would there be extensive interchangeability problems.

The changes in shaft diameter dimension, "U," for type D flange mounted motors are the same as the changes in shaft diameter for foot mounted motors. In four cases the new shafts are larger and in three they are smaller. Shaft dimension changes may not be a serious problem in type D flange mounted motors because special shafts are often designed to fit the users' driven machine. Consequently, the shaft extensions used for a given application are likely to be the same for both the old and new lines in special shafts.

The only other change in type D flange mounted motors (excepting the 20-hp rating) is in the length of shaft extension "AH." In two-thirds of the cases the length of shaft extension is the same on both the old and the new line. However, in the other third, the new shaft extensions are less than the old by as much as 1-⅛ in.

Those then, are the problems in interchangeability for eleven ratings from 1 to 30 hp. Naturally, if other ratings have been selected, somewhat

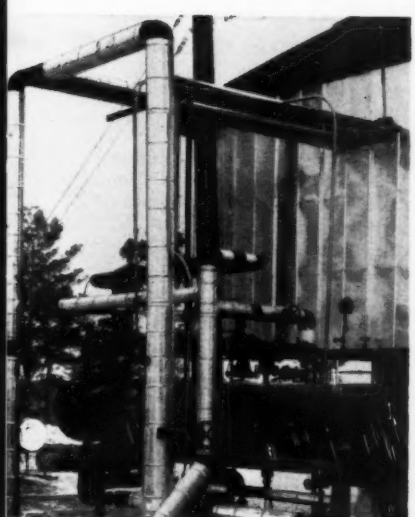
IN PETROLEUM REFINERIES like this a new kind of aluminum jacketing is used to protect the insulation on hot and cold lines. It is known as Childers Aluminum Jacketing and is especially engineered to combine the long life and weather resistance of aluminum with a low first cost. It goes on quick and easy—can be used and re-used. It is made of tough but flexible .006" 35 aluminum alloy, so it handles easily and requires no shop forming.

IN CHEMICAL AND PAPER plants: engineers are finding new uses for this easy-to-handle jacketing. Childers Jacketing here is in use at Scott Paper Company's tremendous Chester, Pa., plant. The insulated line passes between fast moving rolls carrying the felt used in paper making both above and below the line. The Aluminum Jacketing protects against paper dust and water, both of which are always present in the manufacture of paper. The jacketing also appreciably diminishes the possibility of the spread of fire which might strike across ordinary canvas jacketing.

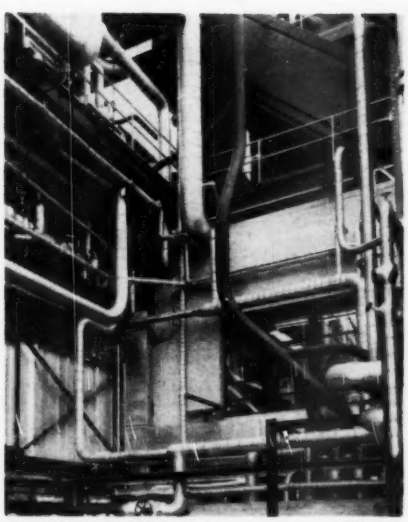
Engineered for outdoor lines — new, low-cost aluminum jacketing now used in 567 processing plants

The new kind of aluminum jacketing for insulated lines shown in the pictures on this page is Childers Aluminum Weatherproof Jacketing. Write for samples and full details, no obligation. Childers Manufacturing Co., Dept. PL-1, 3620 W. 11th St., Houston 8, Texas.

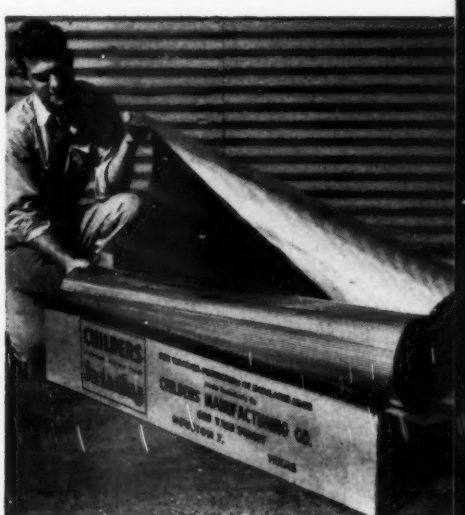
Under CMP regulations, Childers is a Class B product, the use of which is not restricted.



IN FOOD PROCESSING plants such as this Minute Maid Corp. unit at Plymouth, Fla., Childers Jacketing is useful for both indoor and outdoor installations. Its clean, shining appearance and ease of washing are extra advantages.



IN POWER PLANTS—indoors and out—Childers Jacketing is an ideal material for protecting insulation. This is a big outdoor installation in the South. This jacketing needs no painting, and the gleaming aluminum surface makes for "good housekeeping" in any utility or institutional power station.



ALMOST ANYWHERE you have insulated lines in your processing plant, consider this specially engineered jacketing. It is flexible, easy-to-handle; yet it has the appearance values and the weather resistance that are inherent in aluminum. Write to address shown above for full details.

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different findings would have resulted. However, the ratings considered here are representative of what should be expected.

Some of these problems are not easy. All can be solved, however, and most of them can be solved inexpensively.

Tube Straightening

(Continued from page 93)

In this Waterbury plant one new straightener works on 5/32 to 7/16 in. seamless brass and copper tube, while larger model handles this tube with diameters ranging from 5/16 to 1 in. This larger model produces tubing within the desired straightness tolerances at an average speed of 400 fpm.

Another task frequently assigned to rotary straighteners is "skin-hardening." The Viking Copper Tube Co., Cleveland, O. has some customers who desire delivery of relatively soft copper tube with a controlled amount of "skin-hardening" for special-purpose fabrication.

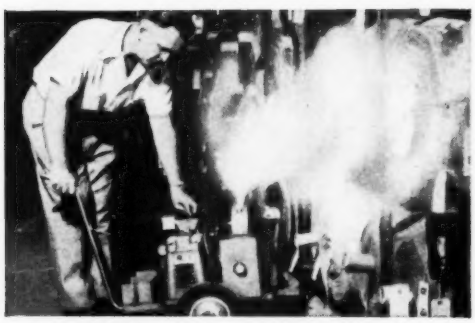
Viking will redraw tube down to required diameters and anneal it to

Rockwell 15-T hardness of 54. One pass through a Model AXY machine and the copper tube emerges straight, round, and hardened to a specification of 15-T-64. This type of "skin-hardening," achieved by a specific adjustment of the straightener, can raise the Rockwell on such tube by about ten points.

Viking uses the rotary straightener on about 75,000 lbs. of tubing per week. With extremely light wall tubing in diameters from 3/8 to 3/16 in., the company is now able to straighten at the high rate of 1,000 lb of tube per hour. This production assumes greater interest when recognition is given to the Reliance variable speed drive installed with the straightener. When straightening soft tube, the rotary machine is operated at about one-quarter of its 400 fpm rated speed; hard tube at 50 per cent of the rated speed.

When the Avon Division of Higbie

control insects with VAPOSECTOR!



West Atomizing Equipment (portable or permanent) has exclusive suction spray nozzles that produce a "dry fog" with uniformly sized 8-micron VAPOSECTOR droplets. These nozzles use less insecticide, cover a wider area, produce a greater kill.

High-potency VAPOSECTOR is formulated for the realist who has an insect problem and wants to get rid of it – *fast!*

VAPOSECTOR is many times more concentrated than the standard grade AA spray – and over four times as economical in use. There's no danger of contamination or odor when used according to directions. It is noncorrosive and will not injure metals, finished surfaces or fabrics, when used as directed.

VAPOSECTOR controls insects by "double penetration." When used with West atomizing equipment, it becomes a "dry fog" that reaches and penetrates hiding places, and then penetrates the insect's outer covering for a permanent kill. Insects have no place to hide, no time to escape. Demonstrations have revealed dead insects in numbers never thought possible.

West can supply VAPOSECTOR, special mill sprays and fumigants, residual and contact insecticides, spraying equipment – *or a complete insect control program tailored to fit your needs!*

WEST DISINFECTING Company

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95,000
GALLONS OF WATER YEARLY!

Cost of wasted water @ $1.90 per M. cu. feet is $24.14.* If the leak is in a hot water faucet then fuel cost for heating this wasted water will be: $88.91 if coal (9,879 lbs.)†; $91.08 if oil (792 gals.)†. $84.41 if gas (84,411 cu. ft.)†. *These figures authenticated by Hackensack Water Co.* and American Gas Association†.*

you can stop this needless waste now with Pat'd
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THE ONLY WASHERS BUILT LIKE A TIRE WITH FIBERGLAS RE-ENFORCEMENT.

Fiberglas, with a melting point of 1200°F., is unaffected by destructive heat of modern superheat water systems; has a tensile strength of 460 lbs. per sq. in.; non-absorbent; resists all chemicals.

'SEXAUER' "EASY-TITES" OUTWEAR ORDINARY WASHERS 6 to 1!

...Now available with a greatly improved special du Pont COMPOUND which adds substantially to longer, trouble-free washer service. This COMPOUND keeps washer from going to pieces under extreme hot water, withstands water impurities and has superior tensile strength. That's why 'Sexauer' "Easy-Tites" won't spread, split or "mush-out." Also why 'Sexauer' "Easy-Tites" outlast all other washers by 6 to 1, thus saving labor on 5 REPEAT REPAIRS, plus water and fuel while prolonging life of expensive fixtures.

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WORLD'S LEADING SPECIALISTS IN PLUMBING AND HEATING REPAIR PARTS

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Mfg. Co., Rochester, Mich. went into the market three years ago to buy a machine to straighten welded steel tubing, it wanted to solve three related problems.

Floor space, at a premium, was to be conserved. Only slight deviation from perfect straightness had to be obtained. Low labor cost was a prime requisite. The installation of a Mackintosh-Hemphill machine appears to have met all three specifications.

Its 8½ by 3 ft. of floor space is less than was required by its predecessor. Steel tube, ¼ to ⅝ in. in diameter, with from 0.020 to 0.042 in. wall, has no more than 0.010 in. deviation per foot as it comes out the straightener.

Tube handling at Avon Tube has a run-in that is merely a 2 in. steel pipe on metal supports. The operator inserts tubing into the pipe until its entry end is caught by the straightener's first pair of rolls. As the tube passes out of the third and last pair of rolls, the tube slides onto a flat, narrow run-out table. A deflector at the far end slides the tube off into a large receiving rack.

One unskilled man and a machine at The National Copper & Smelting Co., Cleveland, are now straightening in three hours all the hard brass tube that production requires—a task that formerly required 32 hours of work by two men.

Before the installation of a new rotary straightener, the Cleveland firm straightened ⅛ to 3/32 in. diameter brass tube having 0.020 in. wall, on equipment rapidly becoming obsolete.

Early in 1953, National Copper replaced the old unit with a new rotary to straighten such items as 7/32 in. hard brass tube which is fabricated by customers into super-straight telescopic antennae for car radios. The prime requirement of the new equipment is to remove the "bow" created in drawing.

Here too, a "skin-hardening" task is assigned the Mackintosh-Hemphill straightener. Twenty-foot lengths of ⅜ in. soft copper tube with 0.020 in. wall are passed through the machine. Correct adjustment of its rolls not only secures precision straightness, but at the same time cold works the tube to "¼ hard."

Machines of this type also successfully straighten butt weld steel pipe. Two Model A-2 rotary straighteners have straightened 15,000 tons of 1½ to 4 in. butt weld steel pipe in an 18-turn per week monthly production schedule in the Indiana Harbor Plant of The Youngstown Sheet and Tube Co., East Chicago, Ind. Pipe in lengths up to 46 ft. are handled.

From these comments on actual straightening procedures it can be seen that the straightening of metal tubing is indeed a vital production operation throughout a variety of plants handling both ferrous and non-ferrous tubing.

Vibration in Electrical Motors

(Continued from page 87)

cases, local hot spot does not remain in one position and a wandering condition of unbalance will result.

If heating at "rub" is very severe and material has yielded in compression while being overheated, the consecutive cooling will not bring the shaft to its original shape and a permanent bend will result. Heated spot will pull the shaft over and cooled shaft will have reverse bend. Misalignment can produce "rubs" by bending shaft and forcing it against seals.

D. Some machines have water cooled bearings. If the machine is brought to rest for a short period of time and the cooling water is permitted to flow, it will be found when bringing machine back to speed that a considerable unbalance will be present.

Due to cooling effect on the lower part of the journal, the bending will appear in the shaft. When this happens, it is necessary to roll rotor at slow speed until temperature becomes uniform along the journals. When balancing a rotor, it is necessary to keep rotor at a steady temperature and prevent local overheating.

If the temperature of the rotor is allowed to change during balancing, the windings of machine will expand or contract relative to iron parts. The relative movement of those parts is uniform and balance vibration readings may be erroneous.

A very common cause of vibration in machines is unbalance in the rotating parts. Unbalance exists when the gravity axis of the rotor does not coincide with the axis through the center journals.

Due to unbalance, the centrifugal forces and couples tend to cause rotor not to rotate about a line through the bearing centers. The bearings and pedestals are subjected to a rotating force, and vibration of bearings, pedestals and of the shaft may result. Unbalance can be either static or dynamic.

In case of rotating discs and flywheels, it can be assumed that all mass is in the middle plane of the rotating body.

If center of gravity is not on the axis of rotation and we put ends of the shaft on the parallel bars, the system will rotate so that the center of gravity occupies the lowest position. That way the heavy side of rotor is found and the correction weight has to be added to the opposite side.

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NEW BOOKS

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Pay Data

1954 PAY ALMANAC. Size 8½ by 11 in.; 166 pp; flexible, looseleaf binding; tabbed sections. Published by Business Reports, Inc., Roslyn, Long Island, N. Y. Price $12.50.

MAJOR PROBLEMS and opportunities in rank and file and management pay during 1954 are covered in this publication. Over 50 pages deal with comparative pay data for key men, office and production workers. An extensive table reports the average pay levels in 350 industries during 1952 and 1953. Different cities are compared in another table as to pay rates within one specific industry.

Data on over 400 union contracts negotiated in 1954 has been included with attention being given to company and union names, number of workers, pay increase and related matters. This information is useful from the standpoint that union contracts set patterns for employers, whether they are unionized or not. A number of key contracts are also listed for negotiation in 1954 or later.

These are some of the vital subjects considered in the survey: profit sharing; employee stock plants; deferred pay; pension planning and the trends to watch; family protection; sick benefits; health insurance plans; and vacations in different industries.

Techniques of Electroplating

MODERN ELECTROPLATING edited by Allen G. Gray. Size 9 by 6 in.; 563 pp; index; appendix; tables; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $8.50.

A COMPREHENSIVE REFERENCE for both the production electrochemist and the theoretical electrochemist. It is gratifying to find a book that has so much material applicable to both aspects of electroplating. Approved and sponsored by the Electrochemical Society, carefully edited so that the contributions from the several authors present a uniform terminology and symbolism, this work is a valuable contribution to the field.

Initially, the general theory is presented, followed by an exposition of the more commonly encountered metals used in plating operations. Some of the less customarily used metals are discussed in addition to plating on surfaces more difficult to process such as magnesium and aluminum. Each section is concluded with an ample bibliography, and the appendix presents several tables for rapid reference.

It is recommended that this book be within easy access of all workers and technicians in the field.—HBW

Putting Gases to Work

PROTECTIVE ATMOSPHERES by by A. G. Hotchkiss and H. M. Webber. Size 9 by 6 in.; illustrated; 341 pp; tables; index; cloth bound. Published 1953 by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, New York. Price $7.00.

THE EMPIRICAL ASPECTS of controlling industrial processes and manufacturing procedures are here adequately covered.

Gaseous envinronments for various activities such as reduction, decarburization and chemical reaction processes are compiled and elucidated in some detail.

There are useful chapters covering methods and instruments for testing and controlling gases, also storage and handling of gases. Troubleshooting from the standpoint of mechanical operations and with regard to the safety of operating personnel are also dealt with.

As a practical reference the book is

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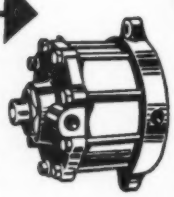

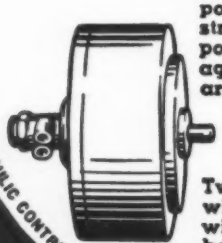

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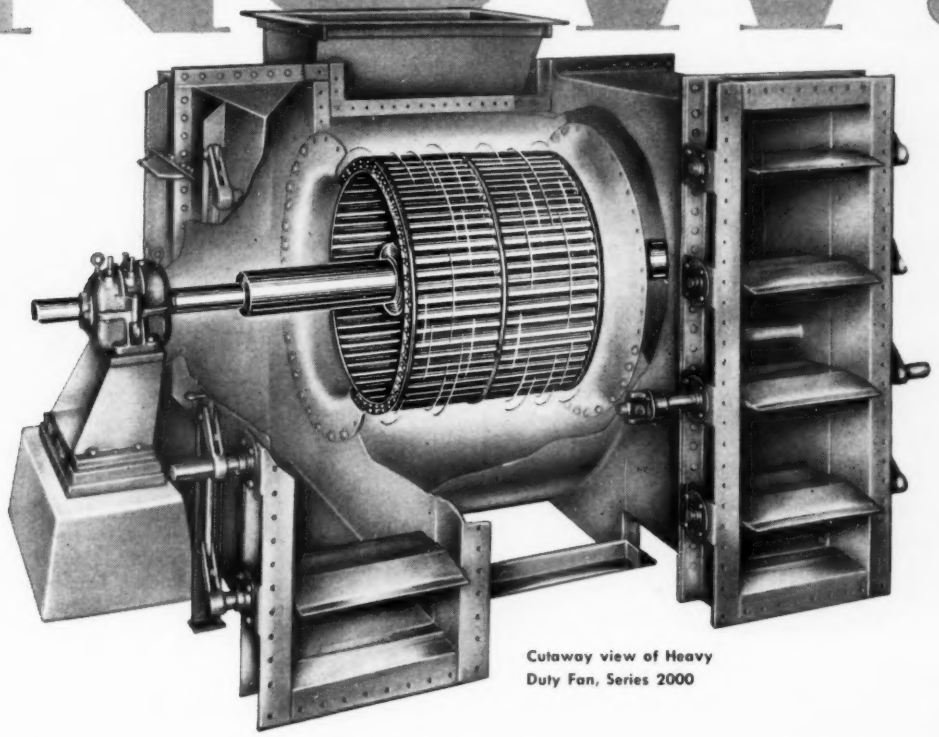

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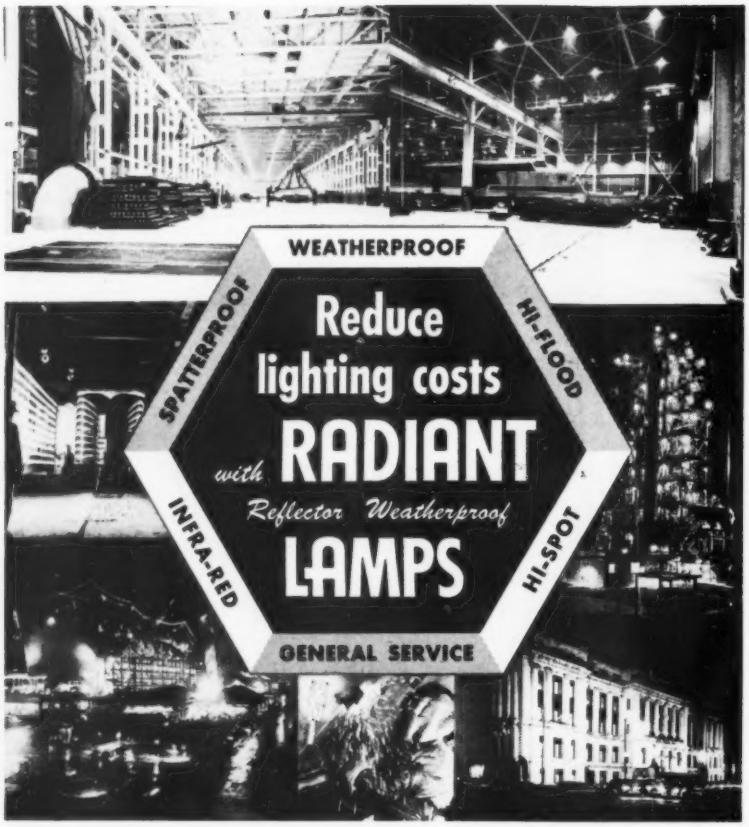

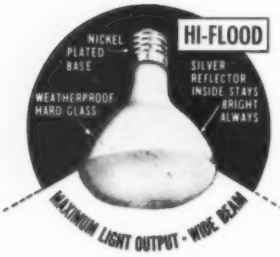

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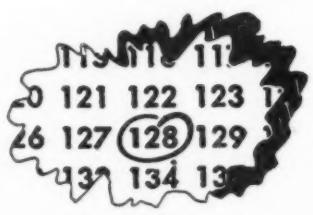

quite useful, but when the authors attempt a theoretical explanation and precise definitions of terms there are inexcusable inaccuracies.

Although it is pointed out in the introduction that the authors are attempting to present a book of practical value, and not a scientific treatise on theory or on equipment design, it would have been much more to the point to have prepared the physics and chemical theoretics statements carefully and to have had them checked by a physical chemist before publication. It is to be hoped that in any future editions of the work this will be done.—HBW

Small Helper for Engineers

MANUAL OF MATHEMATICS. Size 6¾ by 3¾ in.; 334 pp; tab-indexed; paper bound with provision for ring binding. Published by Lefax, Ninth & Sansom Sts., Philadelphia 7, Pa. Price $2.25.

GREAT DEAL of useful mathematical data is compressed into this pocket size manual. It is a handy reference for engineers in the field as well as in the office.

The introductory section is given to a short review of mathematics. This involves arithmetical computation along with geometry, trigonometry and calculus, including a number of integration and differentiation formulas.

Another division in the manual offers extensive listings of six-place logarithms and trigonometric functions.

Guide to Steel Welding

WELDABILITY OF STEELS by Robert D. Stout and W. D'Orville Doty. Size 9¼ by 6 in.; 381 pp; illustrated; cloth bound. Published 1953 by American Welding Society, 33 West 39th St., New York 18, New York. Price $6.50. (20 per cent discount to A.W.S. and W.R.C. members.)

THIS BOOK COVERS the particular aspects of metallurgy of welding steel in various types of equipment and for the fabrication of a variety of finished items.

Prepared under a guidance of the Welding Research Council, Weldability of Steels has a place as an auxiliary text in a course of metallurgy, but in addition, the actively engaged engineer could profitably use it to either find methods for solving many problems or to acquire additional background.

Welding is defined, and explained in terms of metallurgical phenomena, and the applications of welding techniques to steel are discussed. Weldability with relation to fabrication and maintenance are examined thoroughly. Structural aspects are pointed out and, in conclusion, tests for suitability of materials for welding and an index of the several types of steel employed are presented.—HBW

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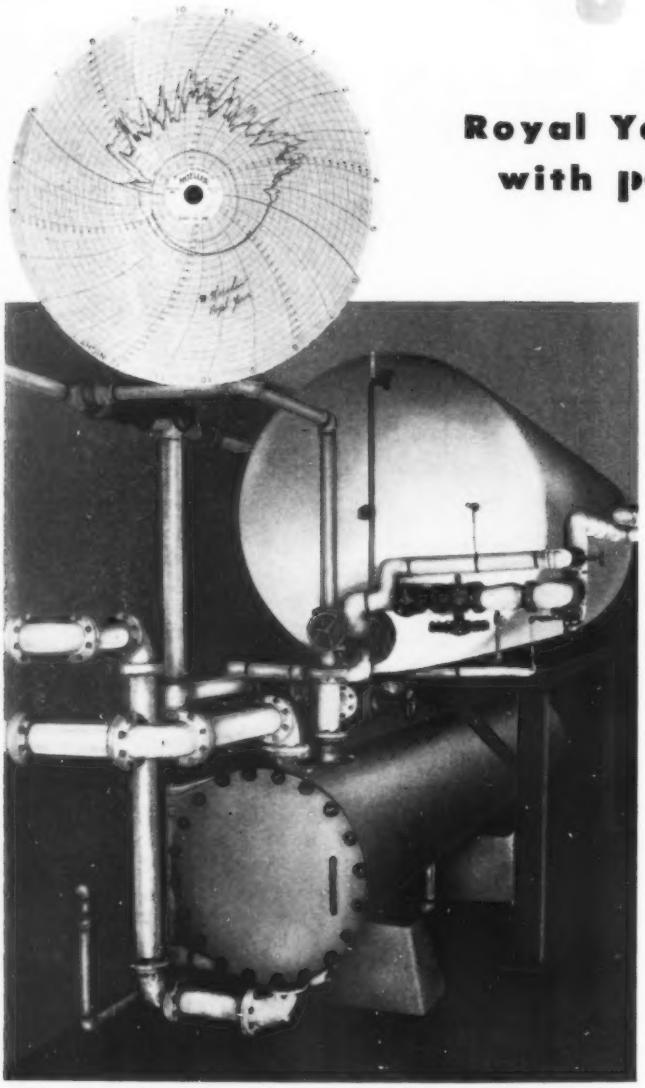

Photo shows p·k waste water heat reclaimer at Royal, plus p·k cement lined hot water storage heater. Chart authenticated by Mr. Kershaw, shows typical twelve hour day operation. Incoming city water is heated from 48° to 105°, without cost by the p·k waste water heat reclaimer.

Since they installed a p·k waste water heat reclaimer, Royal Yarn Dyeing Corp. of Brooklyn regularly save a minimum of 600 gallons of fuel oil each day, costing 6 cents a gallon.

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If you are presently dumping hot process water down the drain, or not getting the maximum waste heat recovery from your present equipment, you can get the right facts and figures from p·k without obligation. Write now and ask for catalog #310.

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(Continued from page 28)

133 **Snap-Around Ammeters** — Company's line of pocket-sized snap-around volt-ammeters for variety of jobs and budgets is shown in Amprobe Catalog 134. Includes high-voltage models for plant use, multi-range for higher current requirements. Describes the Energizer, an accessory for quick current and voltage check at outlet, lists time and money-saving applications. Pyramid Instrument Corp.

134 **Magnetic Contactors**—Bulletin 501 and 502, 8 pp, describes company's Noark magnetic contactors, electric switches in which make-and-break action is controlled by electro-magnet and used for resistance loads, or where overload protection is not provided for. Shows NEMA enclosure types available and lists dimensions. Federal Electric Products Co.

135 **Underground Duct Installation**—Bulletin 54B, 8 pp, is a manual of recommended field practices for installing Soapstone Oct-O-Duct, a non-metallic underground conduit for power and communication circuits. Illustrates methods for preparing trenches, erecting duct structures and manholes and encasing. Soapstone Duct Co.

MATERIALS HANDLING

136 **Materials Handling Ideas**—A materials handling system based on keeping materials "square and upright" is presented in this 32-pp catalog. Shows how this system cuts costs, saves labor and space. Transports, skids, pallets, bins, trays, racks, stacking units and trucks are pictured along with full ordering and application information. Some representative installations are illustrated by photos. Price lists included. Factory Service Co.

137 **Elevator Belting**—This 24-pp illustrated engineering handbook on elevator belting describes types of belt and bucket elevators, gives factors for belt selection and outlines procedures for engineering correct belt. Data tables include weights of materials handled, holding properties of various fabrics, determining belt weight and thickness, drive factors. Includes suggested specifications form giving ordering information. Available to qualified plant engineers. The B. F. Goodrich Co.

138 **Platform Trucks**—Catalog T-54, 32-pp, provides photos, structural details, specifications and other information on more than 50 models of two-wheel hand trucks, steel framed platform trucks, lift jack platform trucks, wagon trucks and dollies. Includes an average load rating recommendation chart showing best loading from 200 to 4000 lb for all types of trucks. Among recent developments covered are company's "Stairmaster" designed to "walk" the load over steps. The Fairbanks Co.

139 **Fork Trucks**—The advantages of palletized handling are given in a 16-pp bulletin on the Palletier fork truck. Gives specifications, dimensional drawings of eight models, with capacities from 1000 to 8000 lb, available in range of lifting heights. Barrett-Cravens Co.

140 **Industrial Tractors** — Manufacturer's complete line of tractors and motor graders is pictorially described in 36-pp Bulletin MS-450-5310. Includes motors scrapers and wagons, expanded line of pull-type scrapers. Ten-pp section gives data on selection of equipment and attachments used with equipment. Tractor Div., Allis-Chalmers Mfg. Co.

141 **Floating Dock Ramp**—This bulletin describes a manual floating, 20,000-lb capacity hydraulic adjustable ramp for bridging loading platforms with highway truck beds. Includes operating and design details and specifications. Rowe Methods, Inc.

MACHINE SHOP AND METALWORKING EQUIPMENT

142 **Metal Cutting Guide**—Bulletin 121-V-12 is a 28-pp pocket-size guide for users of metal-cutting saw blades. Sections on hand, power and band sawing give tips on the right blade for the job, and list precautions to be observed. Gives specifications for manufacturer's complete assortment of blades and frames. Victor Saw Works, Inc.

143 **Cutting, Grinding Procedures**—Circular 953, describing Trim, manufacturer's coolant, contains a pocket-size 44-pp booklet on cutting and grinding procedures. Both have charts and graphs showing recommended concentrations for machining different metals in all metal-working operations, also technical data on proper methods to increase production and prolong tool life. Master Chemical Corp.

144 **Metal Machining Characteristics**—"First Report: The Machining Characteristics of Leaded Steel and Free-Cutting Brass," is a 48-pp booklet comparing machinability of these metals. Compares pieces produced and wear on cutting tools. Many photos are shown, including those of microstructure of the metals. Charts and diagrams are provided. In addition to test data, book covers manufacturing costs, factors of machinability, tool down-time and replacement. Titan Metal Mfg. Co.

145 **Power Machines** — This 16-pp power machine catalog discusses selling features, dimensions, operating capacities, ordering specifications, dies available for five pipe machines and power drives. Sketches show adaptations and features of equipment. Also discusses company's new "55" universal nipple, a featured accessory for power drives and bolt machines. Beaver Pipe Tools, Inc.

146 **Abrasives**—Catalog AB-53, 12 pp, gives properties and uses of company's Blastrite line of abrasive materials, including chilled Hi-alloy B cast iron and malleable shot and grit, steel and cut steel wire shot. Contains consumption chart showing various types of abrasives and their consumption in pounds per wheel hour. Abrasive Shot and Grit Co.

147 **Metallic Abrasives**—Sixteen-pp Catalog 1153 contains detailed descriptive material on company's line of iron and steel shot. Tells how to select the proper abrasive for the job. Explains shot peening and abrasive impact cleaning processes. An abrasive consumption chart lists the various abrasives and gives their rates. The Cleveland Metal Abrasive Co.

METALS

148 **Alloy Reference Chart**—An alloy reference chart listing chemical analyses, physical properties and recommended applications for 28 grades of cast stainless steel is now available. Indicates ACI, AISI, SAE, ASTN and general type designations; gives data on heat treatment, remarks on weldabilty and machinability. The Cooper Alloy Foundry Co.

149 **Cold-Finished Steels**—Ten grades of cold finished case-hardening Jalcase steels are discussed in Bulletin AD-6, 14 pp. Describes properties of this free-machining open hearth steel as easy machinability, minimum distortion, faster heat treatment, high wear resistance. Jones & Laughlin Steel Corp.

150 **Stainless in Paper Industries**—This handsomely illustrated 36-pp book covers use of company's stainless steel in paper and pulp industries. Provides detailed information on the technology of stainless steel; also includes a stainless steel "finder" giving comparative properties of various grades, and a table showing corrosion resistance to various media. Allegheny Ludlum Steel Corp.

TUBING

151 **Two-Metal Tubes**—Sixteen-pp Technical Bulletin 1954 explains use of manufacturer's Duplex tubes for heat exchanger and condensers in industries and process plants han-

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31	32	33	34	35	
36	37	38	39	40	
41	42	43	44	45	
46	47	48	49	50	

BULLETINS

101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116
117	118	119	120	121	122	123	124
125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148
149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164
165	166	167	168	169	170	171	172
173	174	175	176	177	178	179	180

DATA FILE

201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231
232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262
263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293
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501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	
531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	
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dling corrosives. Tells how corrosion attacking inside and outside of tubes can be retarded with Duplex tubes, whose inner and outer walls are made of different metals—the outer metal selected to cope with the outside corrosion, and the inner metal to stand up under inside corrosive conditions. Bulletin discusses handling of products found in chemical processes, manufacturer of food and synthetic fibers, cooling of lubricating oils and other application of the Duplex tubes. Bridgeport Brass Co.

152 **Stainless Steel Tubing**—Bulletin S-222 describes seamless and welded stainless steel tubes, along with their advantages and applications. Gives thicknesses, typical analyses, standard tolerances, technical and fabricating data. Globe Steel Tubes Co.

153 **Want to Use Tubing?**—Now available to plant engineers is a 60-pp illustrated booklet on machines for working tubing. Covers hand- and power-operated bending machines, saws, shears and cutters. Includes information on bending ductile metals at low cost, on factors involved in determining correct bending equipment required. Wallace Supplies Mfg. Co.

154 **Heat Exchanger, Condenser Tubing**—Bulletin TB-329A provides analyses and mechanical properties of 29 carbon, alloy and stainless tubing steels for various heat exchangers and condensers. Tables give reference specifications. Tubular Products Div., The Babcock & Wilcox Co.

CONSTRUCTION AND MAINTENANCE

155 **Glazed Facing Tile**—Construction details and estimating data for ceramic glazed structural facing tile are provided in this 32-pp full-color catalog. In addition to detailed wall drawings and a section showing light reflection values for more than 40 applications, the brochure gives several pages of shape drawings. Installation photos and a brick-tile coursing table are included. Metropolitan Brick, Inc.

156 **Concrete Flooring**—This bulletin introduces company's Metal-Seeded Dynapakt, a concrete flooring process designed for maximum compaction and adhesion of concrete and metal-chip composition. Explains how its veneer of iron-chip aggregate acts as a non-spalling, non-crumbling armor over concrete topping. Flash-Stone Co., Inc.

157 **Window Sash Maintenance**—Bulletin U 5350 presents 16-pp of window sash maintenance information covering caulking and glazing, painting rusted metal, sill restoration. Generously illustrated with photos, diagrams and sketches, this practical booklet discusses mastic glazing versus putty, window installation, sash deterioration, trouble shooting. Also discusses common window types, painting before glazing, and rust prevention. Announces a new caulking compound. The Tremco Mfg. Co.

158 **Metal Compartments**—Specifications on a line of compartments, including toilet, shower and dressing room units, are given in Catalog 54-T, 20 pp. Includes detail drawings and typical layouts for compartments. Color chart shows 20 standard colors available in porcelain and baked-on enamel, in addition to black, white. Also shows standard hardware. Mills Metal Compartment Co., Div., The Mills Co.

159 **Corrosion Protection Data**—A detailed study of the performance of various protective coating systems, this bulletin gives test data on 11 coating systems exposed up to 83 weeks in hydrochloric acid atmosphere. Illustrated with photos, includes corrosion-failure time comparison chart. Gates Engineering Co.

160 **For Waterproofing, Decorating Masonry**—Brochure A. I. A. 25-C-2 describes methods of combining decoration with waterproofing of masonry surfaces, including brick, asbestos shingle and concrete, by use of Pruf-tite masonry paints. User's Guide gives application, surface preparation and specification data. Prufcoat Laboratories, Inc.

161 **Applied Quiet**—This folder describes Hushmush, a sound deadening and vibration dampening material in types for spray-on or wipe-on application. Stresses economy, fast drying, fire resistance and other advantages of the material. Gives drying time and coverage, also application recommendations and instructions for finishing. The Philip Carey Mfg. Co.

162 **Stationary Vacuum Systems**—Bulletin A-939, 12 pp, describes company's stationary vacuum cleaning equipment. Gives basic elements of system with central dust collection described in detail. Pictures coordinated accessories, auxiliary equipment, including portable separators, water traps, rotary discharge valves. Lists questions on data required for design of any plant cleaning system. U. S. Hoffman Machinery Corp.

PUMPS, PUMPING

163 **Centrifugal, Turbine Pumps**—Eight-pp illustrated selection guide and index to company's current centrifugal and APCO turbine type pumps features color selection table showing how many gpm each type will deliver under various head capacities. Describes horizontal split case, non-clog centrifugal, mixed flow pumps. Aurora Pump Co. Div., New York Air Brake Co.

164 **Chemical Pumps**—This 24-pp brochure, Section 100, explains special designs of regenerative turbine pumps available for chemical services. Illustrates pumps in 21 and 22 series, giving construction data, specification sheet, dimensions, performance tables. Contains detailed explanation of net positive suction head, with data on its use in selecting pumps. Includes survey and evaluation of a variety of mechanical seals available in turbine chemical pumps. Roy E. Roth Co.

165 **Sump Pumps**—Construction details, head and capacity tables, dimensions, for company's Unit-Line sump pumps (a pre-engineered packaged line, from which required pump can be selected) are provided in 8-pp illustrated Bulletin 1029. Johnston Pump Co.

166 **Packaged Feed Systems**—Bulletin T-1153, outlines "packaged" chemical feed systems for water treating applications and other chemical single and partitioned tanks, equipped wtih simplex or duplex pumps for feeding one or two chemicals in correct proportion. Accessory equipment is listed. Philadelphia Pump and Machinery Corp.

HEATING

167 **Heat Transfer Equipment**—Sixteen-pp Bulletin 1000 groups company's Paracoil heat exchanger products into chemical, industrial, power plant, and marine classifications. Includes 50 product illustrations, with full technical descriptions; also section on industrial fuel oil heaters. Davis Engineering Corp.

168 **Induction Heat**—Bulletin GEA-5983, 8 pp, outlines benefits of induction heat in the forging industry. Includes case histories of on-the-job applications. Provides frequency-time-work diameter charts to aid in determining requirements. General Electric Co.

169 **Self-Modulating Zone Heating**—The SelecTemp heating system which permits individual thermostatic control of temperature in each area, is described in Form 2769, 8 pp. Explains operation of system components, independent operation of each heater unit fuel savings, low installation cost, other advantages. Diagrams show examples of a central manifold system, two pipe system and down feed system. Iron Fireman Mfg. Co.

170 **High Temp Water Systems**—Sixteen-pp Bulletin 100 discusses and illustrates the application of high temperature high pressure

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171 **Heating Pipelines** — Eight-pp Bulletin GEA-5095A describes numerous pipeline applications of company's Calrod tubular heaters; tells how to calculate heating requirements. Comprehensive chart shows heat losses of vertical, solid, smooth surfaces of various metals. General Electric Co.

OTHER EQUIPMENT

172 **Facts on Purifiers**—Eight-pp Bulletin 700 shows how manufacturer's Hi-eF purifiers can cut costs by eliminating moisture, dirt and entrainment from live steam, exhaust steam, compressed air and gases and vapor. Covers application of these purifiers in steam generation and distribution equipment, in the chemical industries, in petroleum refining and in food processing. The V. D. Anderson Co.

173 **Tips on Wire Rope**—Seventeen suggestions for improving wire rope service are given in a bulletin titled, "How to Get More Work Out of Your Wire Rope." Includes suggestions for correct handling and storing. Leschen Wire Rope Div., H. K. Porter Co., Inc.

174 **To Cut Boiler Plant Costs**—Savings in plant fuel and labor costs by use of continuous boiler blowoff heat recovery equipment is discussed in 8-pp Bulletin WC-114. Charts, curves and calculations show how to compute savings in Btu per year. Flow diagrams illustrate such type systems as flash and non-flash, single and double flash tank, and combination flash-deaerator. Lists accepted American Boiler and Affiliated Industries standards for total dissolved solids and suggested silica concentrations in boiler systems, also blowoff. Graver Water Conditioning Co.

175 **For Better Fastening**—Catalog 50, 36 pp, designed to aid plant engineers in the selection of better fasteners for products. Special features of the book include complete data on physical characteristics and ASA dimension standards, charts for standard sizes and list prices, specifications on point styles of hollow set screws combined into one chart, and illustrated index. Mac-it Parts Co.

176 **For Industrial Radiography**—A guide for X-raying such metals as steel, magnesium and aluminum, with recommendations as to type of film and exposure for each, is described in this 28-pp catalog. Provides exposure and processing data for each of the company's films used in industrial radiography. Photo Products Dept., E. I. du Pont de Nemours & Co.

177 **Metal Chain**—Twelve-pp Bulletin 53-56 describes user benefits of company's Rex-Z-Metal chain. Gives test data showing strength, abrasion resistance, corrosion resistance and long service life. Photos show chain in use in a variety of industrial applications from pump mills to food plants. Chain Belt Co.

178 **For Oil-Contaminated Water**—Plant engineers faced with oil-contaminated water problems are offered 8-pp Brochure FA-46A which discusses removal of emulsified oil from condensate or process water by Sorbo-Cel, a specially-treated Celite diatomite filter aid. Describes types of filters used and gives step-by-step directions on operation of filtration system. Johns-Manville.

179 **Foundry Mechanization**—Manufacturer's full line of equipment for ferrous and non-ferrous foundry mechanization, how it helps increase production and produces better castings are discussed in Book 2423. 40 pp. Describes and illustrates sand preparation and mold, core, casting and sand handling equipment. Drawings show seven tested foundry layouts, each a different type and capacity operation. Link-Belt Co.

180 **Industrial Equipment** — Bulletin WP-1099-B61, 16 pp, describes manufacturer's industrial equipment including centrifugal refrigeration systems, condensers and coolers, steam power plant equipment, water conditioning deaerators and rotary pumps. Gives features, types, sizes, capacities, and describes their application. Worthington Corp.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided on pages 37-38 and 187-188.

MATERIALS HANDLING

201 **Data on Tramrail Equipment**—Twelve-pp Form 2008F is a well organized booklet on tramrail systems. Tells what an installation can do toward improving handling efficiency. Rail and arch design, switches, cranes and transfer bridges, carries, hoists, cranes, buckets, grabs are pictured. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

202 **Engineered Monorail Applications**—A file of application literature is announced as the beginning of a new service offered potential users of monorail equipment. Includes a technical booklet on automatic dispatch systems and an equipment bulletin in addition to several case studies of installations. As they are completed new groups of case studies will be sent to holders of file. Available to qualified plant engineers. The American MonoRail Co.

203 **For Overhead Handling**—This 12-pp illustrated catalog covers motorized and hand operated cranes and monorails engineered for efficient, low-cost handling. Special construction features are detailed; accessory equipment shown. Abell-Howe Co.

204 **Engineered Conveyor Systems**—Catalog 853, 32 pp, illustrates conveyor systems in use in a wide range of industries showing how they suit handling requirements involved. Roller, wheel, belt, chain, overhead trolley and elevating conveyors are included, also spirals, portable power conveyors, ball transfers and special equipment. Mathews Conveyer Co.

205 **Continuous Power Conveyor**—Catalog A-93 is a generously illustrated 64-pp manual and ordering guide covering company's 2035 Zig-Zag continuous power conveyor and Safe-Rail track. Filled with photos of installations in a wide range of industrial drawings, dimensions, specifications. Tells features of the conveyor and track, tells how track is joined, suggests suspension methods. Gives detailed information on chain, power units, speed changing equipment, pendants, and accessory equipment. Richards-Wilcox Mfg. Co.

206 **Metal Conveyor Belts**—This 24-pp booklet is an illustrated guide to selection of metal conveyor belts. Presents both conventional and balanced spiral weave belts; covers raised edge and flight constructions, chain edge construction, high temperature belts, wire conveyor aprons. Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp.

207 **Conveyor and Elevator Belting Tips**—This 32-pp manual on installation, maintenance and care of conveyor and elevator belting, uses photos and drawings to show ways to improve belt service and lengthen belt life. Includes a discussion of belt design, covers, reinforcements and grades. Repair methods, splicing, and fastening are also covered, and there's a table listing common conveyor belt maintenance problems with their causes and remedies. The B. F. Goodrich Co.

208 **Metal Conveyor Belts**—This 24-pp booklet is an illustrated guide to selection of metal conveyor belts. Presents both conventional and balanced spiral weave belts; covers raised edge and flight constructions, chain edge construction, high temperature belts, wire conveyor aprons. Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp.

209 **Conveyor Belting**—Twelve types of conveyor belting, for standard heavy duty and special applications, are described in this bulletin. Pictures the belting in use, and discusses in detail some of the impregnations, coatings. Main Belting Co.

210 **Chain Hoists**—Catalog 61, 32 pp, covers a line of chain hoists, telling how to select and use them. Provides an illustrated comparison chart of hoist types, a selector table and discussion of factors to be considered in buying a hoist. Multiple gear chain hoists, screw gear chain hoists, differential chain hoists described separately. Reading Crane & Hoist Corp.

211 **Manual on Electric Hoists**—Catalog H-46, 4 pp, covers monorail and stationary hoists and car pulleys. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls. American Engineering Co.

212 **Industrial Lifts**—This booklet presents a wide range of elevating equipment designed to step up efficiency and cut handling costs. Covers dock lifts, crossover bridges, sidewalk elevators and truck service lift. The Wayne Pump Co.

213 **Electric Hoist Manual**—Catalog 215-B offers 38 pp of engineering, application and ordering information on company's Load Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys, hoists for low head. Manning, Maxwell & Moore, Inc.

214 **How to Operate a Crane**—Booklet 920 is a 48-pp generously illustrated instruction book on crane operation, helpful to both beginner and seasoned operator. It shows hand signals, defines crane and hoist terminology. Covering all phases of crane operation, it discusses in detail the co-ordination of crane motions, and includes safety rules and inspection, maintenance tips. Individual copies of this book are free to qualified plant engineers. The Electric Controller & Mfg. Co.

215 **Locomotive Cranes**—Catalog 84, 16 pp, stresses advantages of the torque control unit used in company's cranes, and features illustrations of the mechanism and converter unit. Describes in detail the sealed, anti-friction bearings, air controls, brake, limit switch and other components. Orton Crane & Shovel Co.

216 **Shovel and Loader**—Described in 12-pp Bulletin 1932 is a hydraulic crown and hoist shovel and loader incorporating mechanical features usually associated with big shovels. Illustrates, gives specifications, application information on both pneumatic traction and crawler traction models. Dempster Bros., Inc.

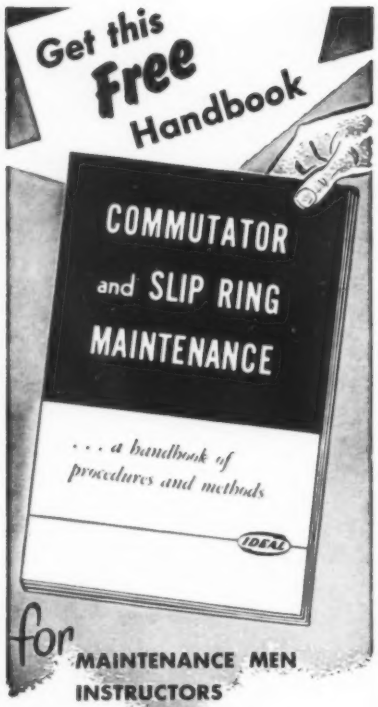
217 **Trolley Hoists**—Bulletin DH-269, 2 pp, describes and pictures ½ to 3 t capacity army-type trolley hoists, plain or geared, for use where a close headroom assembly is required. Gives dimensional and capacity data, prices. Wright Hoist Div., American Chain & Cable Co., Inc.

218 **Portable Hoists**—Description and specifications of more than 100 types and sizes of portable hoists appear in 8-pp Bulletin CL. They include ratchet, lever hoists in roller and coil-chain models, with capacities from ¾ to 15 tons, standard, specialized spur gear hoists, Quik-Lift electric hoists. Coffing Hoist Co.

219 **Sheet Lifter**—Operational and design features of company's sheet lifting equipment which contributes toward efficient handling, flexibility and economy are explained in Bulletin S-25, 16-pp. Cullen-Friestedt Co.

220 **Material Handling System**—Catalog 83 is a 12-pp booklet showing different units in company's Work-O-Matic system. On-the-job photos show material positioning with bin boxes and gravity-fed hoppers, and tiering, storing and dumping with multi-duty boxes and trays. Picture stories tell how end-loading scoops and multi-duty trays go further in integrating production, storage, material movement and disposal than previously thought possible. Union Metal Mfg. Co.

221 **Materials Handling Equipment**—Illustrated Catalog P602 is a 44-pp guidebook on materials handling equipment for industrial



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DATA FILE

(Begins on page 189)

plants. Subjects covered include description and application data on company's gas and electric fork lift trucks, motorized hand trucks, hand lift trucks and hand and electric hoists. The Yale & Towne Mfg. Co.

222 **Industrial Logistics**—Form A-9516-4450 is a 12-pp booklet covering strategic handling of materials from raw state to distribution. Discusses master unit load and transportation cycle. Explains company's system of adapting all loads to four types of containers, assembling maximum numbers of these into master unit loads, and transporting them as single units. The Elwell-Parker Electric Co.

223 **Industrial Truck Reference Guide**—Bulletin 300, 44 pp, covers company's line of current model tractors, trailers, fork lift trucks, platform lift trucks and load-carrying trucks. Major categories are: the trackless-train system; the fork-truck pallet system; and the lift truck-skid system. Each category is preceded by an analysis of applications and merits of the handling system. Mercury Mfg. Co.

224 **For "Floor Level" Handling**—Junior Catalog 535 is the 100-pp eleventh edition of company's well known pocket-size catalog. Contains information, illustrations and specifications on fork trucks, high lift electric trucks, pallet trucks, industrial tractors, electric and hand lift trucks, Steeleg skids and boxes, semi-live skids and lifters, portable elevators and cranes, stacking frames, storage racks, die tables, and other handling specialties. Barrett-Cravens Co.

225 **How to Pick a Truck**—Catalog 54. 8 pp, features a step-by-step procedure for making the best fork truck choice for a particular handling job. Other sections in the booklet show at a glance complete specifications on each of company's trucks, and illustrate important construction and design features. The Baker-Raulang Co.

226 **Elevator Sills**—This illustrated bulletin describes elevator sills which operate like a drawbridge. Features a model for mounting on the elevator itself which, when lowered, bridges gap between floor and elevator and, when upright, serves to keep trucks from rolling to elevator edge. Also describes a model for mounting to building floors, one designed for truck loading and other special models. Alexander Sill Co.

227 **Grips for Safe Handling**—Bulletin 200R, 24 pp, pictures and gives ordering and application information on hooks, tongs, grips, and slings. Covers their use with a wide range of materials, including steel plates, pipe and round bar stock, drums and barrels, coils, cartons, baled material, timbers. Also lists chain pocket wheels and guides. Includes current price sheet. Downs Crane & Hoist Co.

228 **For Hopper Economy**—"In Dollars and Sense" explains long run economy of company's self-dumping hoppers, showing how they operate and telling how they fit particular plant requirements. Illustrated with photos, gives dimensions, weight of a standard 1-yd model. Roura Iron Works.

LUBRICANTS, LUBRICATION

229 **Cooperative Technical Consultation Service**—This 24-pp booklet presents company's periodic consultation service offered to industrial plants and aimed at efficient use of petroleum products. Covers services available in solution of lubrication problems, metal-working operations, processing, fuel and heating oils, dust control. Gulf Oil Corp., Gulf Refining Co.

230 **Lubrication of Chain Drives**—Vol. 39, No. 8 of Lubrication offers a 10-pp discussion on chain drives and their lubrication. Covers types of chains, conditions affecting their lubrication, choice of lubricants. Includes table showing lubricant recommendations for chain drives. Generously illustrated with photos and sketches showing chain arrangements, methods of lubrication. The Texas Co.

231 **Centralized Lubrication** — Featuring selection charts covering low and high pres-

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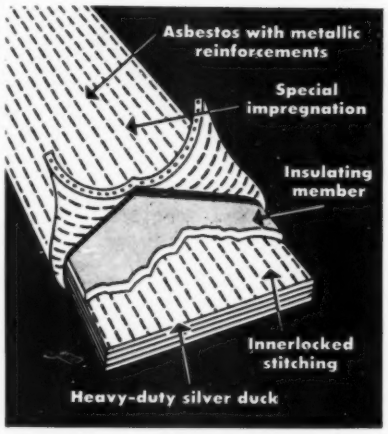

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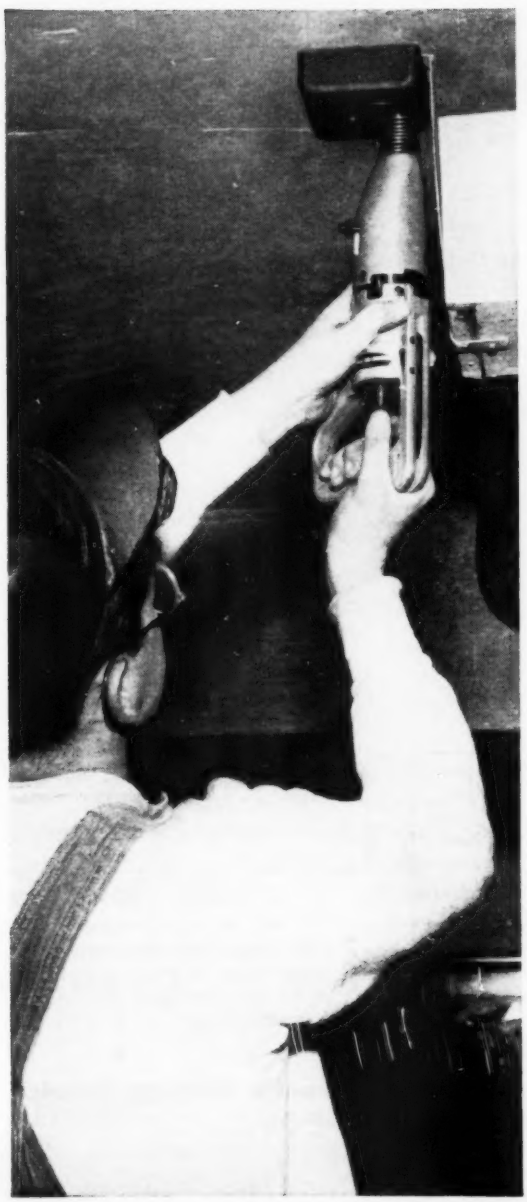

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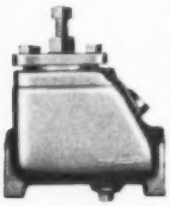

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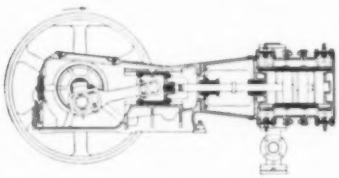

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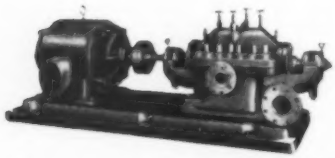

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DATA FILE

(Begins on page 189)

sure fluid lubrication systems for a wide range of industries and providing an explanation of operating principles of various types of systems, 24-pp Catalog 80 covers company's lubricant application equipment. Describes and pictures lubricant pumps, transfer and dispensing equipment. Lincoln Engineering Co.

232 **Multi-Purpose Grease**—This bulletin describes Gargoyle Grease BRB No. 1, intended to provide correct lubrication for practically all normally loaded anti-friction and plain bearings. Tells how it resists leakage, protects against rust and corrosion. Socony-Vacuum Oil Co.

233 **Lubricant Data Book**—This pocket-size 56-pp booklet gives product information and principal uses of approximately 40 lubricants of both grease and fluid types, and general directions for proper application. Discusses lubricant requirements of equipment in 25 major industries. Lubriplate Div., Fiske Bros. Refining Co.

234 **Force Feed Lubricators**—12-pp Catalog 25 G describes and pictures company's new Model 25 lubricator, a popular priced, general purpose unit adaptable to many applications. Lists machines for which it provides economical, automatic lubrication. Discusses drive arrangements. Manzel Div., Frontier Industries, Inc.

ELECTRICAL EQUIPMENT

235 **Motor-Generator Reference Book**—Publication 51R7933 is a 50-pp booklet compiled to assist in the selection of motive power to handle most industrial applications. Neither text book nor ordering catalog, this book provides a brief outline of the various types of motors, generators and motor-generator sets, telling their application and operating requirements. Booklet is generously illustrated and includes performance data, ratings, information on methods of speed control. Allis-Chalmers Mfg. Co.

236 **Motor Controls** — In this 28-pp bulletin the most important items in company's line of standard motor control apparatus for all industries are presented. Controls, starters and accessories are described and applications listed. Allen-Bradley Co.

237 **Weatherized Motors** — Six-pp Bulletin 400 describes company's All-Weather integral motors for industrial use. These have full height protection through ventilation, one-piece steel shell, interchangeability of end head. Robbins & Myers, Inc.

238 **Motor Lubrication Tips**—"To Grease or Not to Grease" is an illustrated bulletin on lubrication of ball bearing motors. Gives general information on lubricants and lubricating agents. Discusses importance of lubrication to bearing life. Also covers choice of lubricant and procedure. Wagner Electric Corp.

Postage free cards for ordering these catalogs are on pages 37 and 187. When using them, don't forget to include your job title and company name—even if you want the catalogs to be delivered to your home address

239 **Motor Panorama** — Motors and generators—about 50 types in all—are pictured in Publication AEB 100.8B, which serves as a handy reference, since it lists specific literature dealing with each motor shown. Gives general construction details of each unit. Fairbanks, Morse & Co.

240 **Productive Maintenance** — Publication GED-1691 is a pocket-size 104-pp source of information of value to plant engineers who

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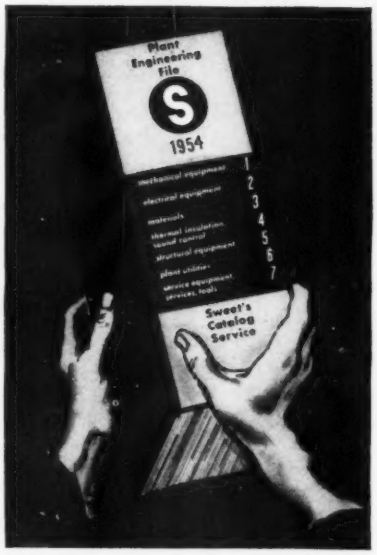

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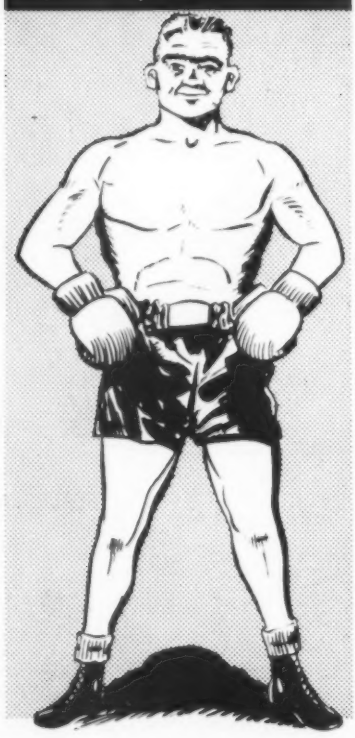

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DATA FILE

(Begins on page 189)

want to get more production from their present motors, generators and control equipment. Besides general maintenance suggestions, the booklet contains trouble shooting charts and recommended renewal parts guides. Also provides wire and cable data and includes a section of formulas and other data pertaining to motors and generators. General Electric Co.

241 **The Answers on Wiring**—"20 Questions and 20 Answers on Safety m.i. Wiring" describes and illustrates characteristics and advantages of this new wiring system. A complete table of types, sizes, weights and lengths, as well as a partial list of users included. General Cable Corp.

242 **Bus Duct Manual**—Booklet B-4272A 68 pp, on bus duct and accessories, presents application and test data, specifications, information on pricing a typical installation. Describes advantages of bus duct or a secondary power distribution system, carrying current from transformers to switchgear—and from there to motors. Westinghouse Electric Corp.

243 **Plug-In Power**—Sixty-pp Catalog 25 offers real help on electrical installation problems involving portable tools, materials handling equipment, cranes, hoists, cutting equipment. Covers a prefabricated trolley busway electrical distribution system to provide outlets for power or light where needed. Feedrail Corp.

244 **Small Bus Duct**—Detailed information on a midget-size bus duct is contained in Bulletin 703. Illustrates entire unit, also trap and hanger. Text discusses major parts, design features. Includes list prices. Frank Adam Electric Co.

245 **Air-Cooled Transformers** — Eight pp Bulletin 153-A describes air-cooled dry-type transformers, stressing their advantages and listing typical applications. Illustrates, and gives construction details and specifications for standard types. Also pictures some special transformers and reactors. Sorgel Electric Co.

246 **FHP Manual Starters**—Bulletin 224 is a folder giving the features and ratings of a line of fractional horsepower manual. Lists applications for these starters and pictures enclosures. Square D Co.

247 **Cartridge Fuses**—Form S-60, 12 pp, describes and illustrates manufacturer's dual-element cartridge fuses designed for long and controlled blowing time. Lists benefits afforded by these fuses and gives data on both ferrule type and knife-blade type. Provides selector table covering sizes of fuses for protection of single-, two- and three-phase motors of 1/6 to 200 hp. Also includes time current curves. Economy Fuse & Mfg. Co.

248 **Handbook on Storage Batteries**—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

LIGHTING, COMMUNICATION

249 **Precision Lamps** — Bulletin 404 offers application and purchasing information on various types of lamps carried by manufacturer. Flood, infra-red, spatterproof, and weatherproof lamps are briefly discussed. Radiant Lamp Corp.

250 **Lighting Fixtures**—New Section K of Condulet Catalog 3000 describes components, performance data, and methods of relamping for any of the manufacturer's new EV series explosion-proof and weather resistant lighting fixtures. It contains illustrations showing steps for easiest relamping and installation of this type of fixture. Crouse-Hinds Co.

251 **Selection Data on Lighting Fixture Hangers**—Catalog 50, 80 pp, contains general

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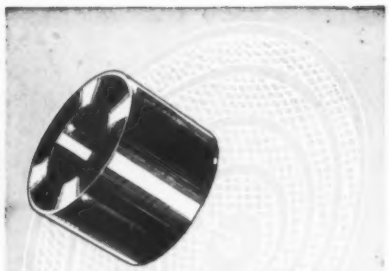

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DATA FILE

(Begins on page 189)

and detailed information on disconnecting and lowering lighting fixture hangers, accessories, special devices and parts. Utilizes 247 photos and drawings to show construction principles, operating features, installations, modifications and component parts for both indoor and outdoor units. The Thompson Electric Co.

252 **For Emergency Lighting**—This bulletin tells how to prevent sudden lighting in failure with the Exide Lightguard, designed to turn on a powerful floodlight when normal current fails. Stresses ease of use, other merits; gives dimensions. The Electric Storage Battery Co.

253 **Adjustable Lighting Units**—Bulletin 134, 8 pp, describes and pictures lights with spring-tension sockets and swivels. Covers both fluorescent and incandescent units, including Coolite incandescent lights with metal shades designed to remain comfortable to the touch. Gives suggestions for use, dimensions, prices. Swivelier Co., Inc.

254 **How to Use Sound Signals**—This new 44-pp combination manual, data book and catalog is an excellent reference work on industrial sound signals. Includes a simplified explanation of fundamentals of sound; a glossary of sound and signal terminology; a quick-comparison guide for selecting equipment; suggested steps in choosing a signal installation, and hints for compiling a code signal call system. Benjamin Electric Mfg. Co.

The two Reader Service Cards on pages 37 and 187 are easy to use and need no postage. Just circle the item number of catalogs wanted.

255 **Sound Powered Telephones**—Catalog 400-B, 8 pp, discusses operating principle, construction details and applications of sound powered telephones. Stresses safety and reliability of these telephones in which the voice of the user supplies the power, no outside power being used. Describes handsets, headsets, industrial stations systems. United States Instrument Corp.

INSTRUMENTS, CONTROLS

256 **Handbook on Automatic Controls** — Catalog 700 provides 45 pp of ordering and application data on automatic controls with mercury contact switches. Covers control equipment for temperature pressure-low water, liquid level bottles; transformer-relays, valves. The Mercoid Corp.

257 **For Liquids Worth Storing** — Bulletin 6405 offers an illustrated discussion of company's self-contained gages for liquid level applications, covering both direct- and remote-reading types, also a dial type hydrostatic gage. Stresses value of measuring stored liquids. Liquidometer Corp.

258 **Wide Range Regulator** — Featured in Bulletin 316 is an expansion stem type temperature regulator operated by water or compressed air. Explains how regulator works. The Powers Regulator Co.

259 **Gages for Many Jobs**—Sixty-eight-pp of liberally illustrated information is offered in Catalog 64. Describes a variety of gage types; air volume controls for pump installations, vapor tension thermometers, d-c ammeters and voltmeters, and water flow meters covered. Includes engineering tables. U. S. Gauge Div., American Machine and Metals Inc.

260 **Electronic Controls** — Eight-pp Catalog F 6166 describes flexibility of an electronic control system for heating, ventilating and air conditioning. Describes temperature controls, control panel, sensing elements, as well as the ultra-sensitive micro relay which simplifies the amplifier. Barber-Colman Co.

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Challengers available in ½-, 1- and 2-ton capacities — other Coffing spur-gear hoists in capacities from ½ to 25 tons.

Here are just a few of the "extras" that keep the new Coffing Challenger spur-gear hoists on the job, save maintenance:

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- The Challenger has only 29 basic parts — simplest spur-gear hoist ever made.
- May be completely disassembled in minutes with ordinary tools.

Test these points yourself. Pick out the toughest hoist job you have, install a Coffing Challenger spur-gear hoist — then see how little maintenance is required, how it *stays on the job.*

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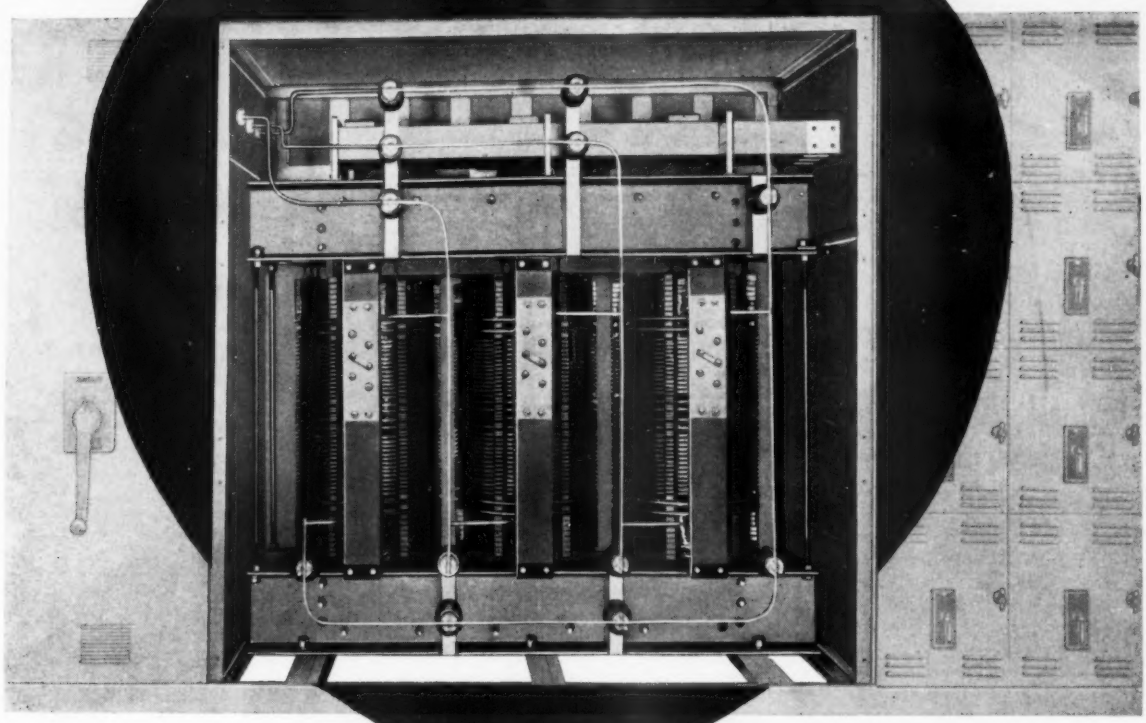
The transformer is the heart of a substation



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A substation is no better than its transformer; therefore, it is important that the transformer is of the best quality — a Sorgel air-cooled dry-type transformer.

Dry-type transformers are the most practical type for indoor installations. They require little or no maintenance; no liquid to check or replenish; no fire hazard; small and compact; economical; easy and convenient to install; no vault required; can be placed close to load center, resulting in better voltage regulation, more efficient distribution, and lower wiring cost. Easily moved when required for expansion or alterations.

Sorgel air-cooled dry-type transformers are top quality, time tested, and are thus recognized and accepted by discriminating engineers and users. Their rugged construction assures continuous, reliable service. Their design is liberal. Efficiency is high. Quiet operation.

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All voltages
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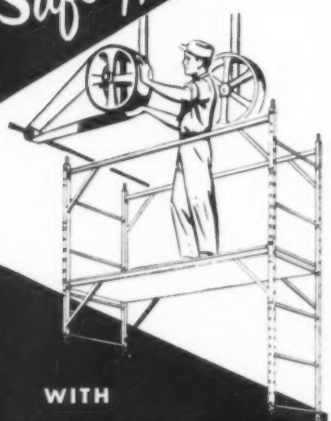

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Platform support trusses lock to upright ladder sections with *both* automatic and manual safety locks . . . cannot be rocked or sprung loose. Locking casters lock both the wheel and the swivel for added safety.

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Company_____

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DATA FILE

(Begins on page 189)

261 **Orifice Meters**—Bulletin 1050 Rev. 1, 28 pp, shows how manufacturer's orifice meters are made, how they operate. Tables give capacity data, and there are descriptions of manifold arrangements and differential ranges, along with illustrations of various parts. Sketches show how meters are used. Rockwell Mfg. Co.

262 **To Watch the Watchman**—Bulletin 107-2, on watchclocks, cites advantages of their use in cutting fire risks, insurance rates, property protection. Describes clock case, movement, recording mechanisms. Stations and keys for the clocks are also described and pictured. Simplex Time Recorder Co.

MECHANICAL POWER TRANSMISSION

263 **Variable Speed Control Simplified** — Bulletin 700 contains some 40 pp of descriptive application and engineering data on variable speed pulleys and selective speed transmissions. Illustrations show how old and new machines can be equipped with efficient speed control. Lovejoy Flexible Coupling Co.

264 **Speed Reducers** — Besides covering a full line of worm gear speed reducers, 48-pp Catalog 1006 contain a section devoted to speed reducer selection, horsepower and torque calculations and service factors. Lists single-reduction and double-reduction worm gear types, worm gear screw conveyor drives and reducers, and gearmotors. Features company's new PoweRgear reducer designed to offer more horsepower per dollar. Fully illustrated, includes ratings, dimensions, prices. Eberhardt-Denver Co.

265 **Improved V-Belts**—This literature on company's Vulco rope drives explains how this rope with concave sides is designed to fill out to a precise fit in the sheave groove, to provide less wear, more pulley contact and more sure power when needed. The Gates Rubber Co.

266 **Power Drive Handbook**—Catalog 709, describing roller chains and sprockets, includes tips on selecting stock roller chains for every type of power drive service. Diamond Chain Co., Inc.

267 **Chart on Belt Care**—In the interest of conserving power transmission belting, this manufacturer offers cardboard wall chart on the care and maintenance of power driven belts. Carries sketches and brief text covering the steps to be taken to select the right belt, install it, use it correctly and keep it in good operating condition. Cling-Surface Co.

268 **Belts to Suit the Job**—This bulletin presents company's "inner-locked" woven duck belting available in types for general elevating and conveying and general power transmission applications as well as special jobs. Imperial Belting Co.

269 **Flexible Couplings** — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail, along with dimensional data. Includes standards for bore specifications. Thomas Flexible Coupling Co.

270 **Spherical Roller Bearing**—A new roller bearing, designed for long service and increased capacity, easy installation and self-alignment, is described in this bulletin. Includes sizes available, also data on increased life capacity expected. SKF Industries, Inc.

271 **Brakes and Brake Motors**—Construction advantages of company's brakes are featured in illustrated Bulletin SL-610-1 on brakes and brake motors. Dimensions, mechanical and electrical characteristics. Crocker-Wheeler Div., Elliot Co.

272 **Sprockets, Roller Chain**—Bulletin A-624 24 pp, is compiled to provide plant engineers with all data required for selecting and order-

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Here is a special fabricating service designed to save time, material and labor in piping systems. By eliminating numerous flanged joints and combining several fittings into one integral unit, as illustrated, Naylor fabrications provide the answer for greater efficiency and economy.

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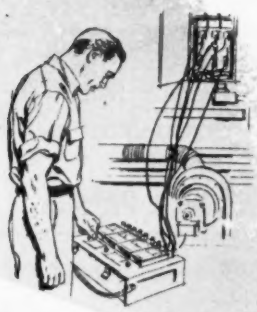

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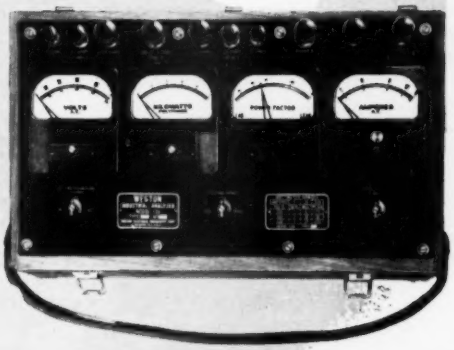
FOR MOTORIZED EQUIPMENT...



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A real timesaver because only one hook-up is necessary to measure a-c current, voltage and power in single and polyphase circuits, as well as power factor in 3 phase, 3 wire, balanced circuits. Adequately insulated binding posts . . . high overload capacity. Furnished in compact oak carrying case measuring only 18⅞" x10⅞"x6⅞".

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Especially designed for checking electronic control and power equipment. Seven d-c voltage ranges: .1 to 1000 (20,000 ohms per volt) . . . six a-c voltage ranges: 5 to 750 (1000 ohms per volt) . . . six d-c current ranges: 50 microamperes to 10 amperes . . . four a-c current ranges: .5 to 10 amperes . . . five resistance ranges: 3000 ohms to 30 megohms . . . all ranges full scale . . . a-c and d-c current ranges extended with external transformer or shunts. New temperature compensated rectifier circuit gives greater a-c accuracy.

WESTON CLAMP VOLT-AMMETER (Model 633) measures current and voltage without breaking circuits and disrupting operations.

Combines in one instrument five full-scale a-c current ranges of 1000/250/100/25/10 amperes with range overlap for good readability . . . three self-contained a-c voltage ranges of 700/350/175 volts, with instrument insulated for 750 volt service. Has convenient 6-position thumb switch for range selection, and adjustable pointer stop for measuring motor starting current.

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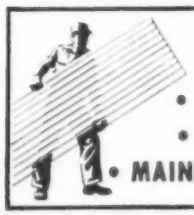

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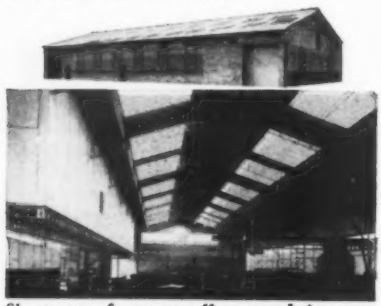

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The pictures above show the even distribution of daylight obtained in a building skylighted and glazed with Resolite. Its diffused light gives workers greater visual comfort . . . cuts artificial light costs. See why more and more nationally known industries are using Resolite for modern plant daylighting.

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DATA FILE

(Begins on page 189)

ing roller chain and sprockets. A page devoted to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Co.

273 Transmission, Control Equipment—Variable speed transmission and speed control devices are presented in 48-pp Catalog 45. Fully illustrated, provides descriptive and application information, operating principles, dimensional tables. More than 60 photos show use of this power transmission equipment in paper mills, food processing plants, textile plants, automotive plants, power plants, others. Lewellen Mfg. Co.

VALVES, TRAPS, PIPING AND ACCESSORIES

274 Bronze Valves—Globe and angle bronze valves with rising stems, union bonnets and stainless steel plug type seats and discs are described in this bulletin. Discusses design advantages, gives dimensions and specifications. Walworth Co.

275 For Quick Valve Selection—Here's a 20-pp catalog digest providing ordering and application information on gate, globe, angle and check valves in bronze, iron, cast and forged steel construction, also valve accessories and parts. Illustrated and thumb-indexed, includes pressure-temperature chart. The Ohio Injector Co.

276 Valve Maintenence Guide—"Prevent Valve Failure Before It Starts," is a 28-pp text on valve selection, installation, inspection. Pictures damaged valves, explains how damage could have been prevented. Discusses maintenance schedules, inspection jobs, lubrication, pipe line checking, threading, regrinding, disc replacement. Jenkins Bros.

277 Valves and Fittings—Illustrated Catalog 47 provides over 60-pp of ordering information and application data on valves and fittings made of stainless steel and other corrosion resistant alloys designed for use where corrosion or contamination are factors. Gate, globe, and angle valves for a wide range of services are presented, also needle valves, sampling valves, screwed and flanged fittings. Design and construction details are shown. Also included is a chart of first and second recommendations of alloys for corrosive media. Alloy Steel Products Co., Inc.

278 Bin Gates, Valves—Twenty-pp Bulletin 1252 covers manufacturer's line of gates and valves, including the Twistite double closure bin valve and the Moore bin gate. The latter, for heavy duty applications, consists of an apron belt which can be rolled away from the bin opening. Complete details and dimensions are provided. Stephens-Adamson Mfg. Co.

279 Handbook on Fittings, Flanges—Catalog wf-1950, 68 pp, offers working information on seamless carbon steel welding fittings and forged steel flanges. Includes dimensional tolerances, thread standards and threading practice; service pressure ratings, physical and chemical requirements. Grinnell Co., Inc.

280 Packless Expansion Joints—Bulletin 35-51A offers 28 pp of up-to-date information on company's Corruflex joints, their design and installation and advantages over other means of providing for thermal expansion in pipelines. Construction features are explained and illustrated; simplified selection data include tables for determining amount of expansion in pipelines. American District Steam Co., Inc.

281 Welded Fittings—Catalog 3 is a 36-pp ordering and engineering reference book on company's Weldolets for piping services. Gives data on butt-welding and socket welding Weldolets as well as on Thredolets for making threaded outlets. Typical installations are pictured; sizes, weights and prices provided. Also included are installation instructions and a technical section. Bonney Forge & Tool Works.

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DATA FILE

(Begins on page 189)

282 **Steam Hook-ups**—This 64-pp manual on hook-ups for steam traps, air vents and temperature controls provides diagrams, size calculators, selection data on traps and regulators, properties of saturated steam, dimensions. Sarco Co., Inc.

283 **Steam Trap Reference Manual** — Bulletin T-1740, 24 pp, tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure trap sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Yarnall-Waring Co.

284 **Steam Trap Book**—Catalog J, 44 pp, includes physical data and prices on cast semi-steel and forged steel inverted bucket steam traps, compound steam traps and ball float air and air relief traps; a handbook section explaining how to calculate condensate loads and select traps for all classes of equipment; a maintenance section. Armstrong Machine Works.

285 **Steam, Air and Gasoline Traps** — Catalog 751, 32 pp, is a recently issued trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressures up to 1500 lb; separators. W. H. Nicholson & Co.

286 **Solving Steam Trap Problems**—This popular 36-pp catalog on steam traps contains specifications and capacities on steam traps, float traps, air release valves and pipe line strainers. Tells how to calculate condensation loads and select traps for all classes of equipment, including unit heaters, jacketed kettles, autoclaves, submerged drips. Gives pointers on how to install traps and service them. The V. D. Anderson Co.

287 **Piping Pointers** — This is company's popular piping manual covering fundamentals of sound piping practices. Discusses various types of valve designs and how each should be used. Pictures and names more than 80 kinds of fittings and contains many illustrated how-to-do-it features. Included with the manual is an 8-pp valve selection guide. Crane Co.

288 **Pipe Fabricating Service**—This bulletin describes a fabricating service designed to save time, material and labor in piping systems. All types of materials can be fabricated. Naylor Pipe Co.

289 **Wrought Iron for Piping**—This 32-pp booklet covers commonly used pipe materials and method of selecting them for specific types of service in modern building construction. Discusses wrought iron, cast iron and steel pipe, also copper and brass pipe, and the factors entering into the relative costs of piping materials. Pipe selection is treated, with emphasis on corrosion resistance. A. M. Byers Co.

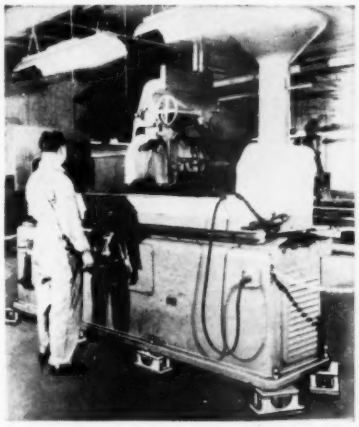
CONSTRUCTION

290 **Painting with Aluminum**—Again made available to plant engineers is Form AD-228, 32 pp, on the use of aluminum paint. Discusses advantages of aluminum paints, describes three basic types for non-absorbent surfaces for weather-exposed wood, and for heated surfaces and those not exposed to weather. Typical maintenance applications are covered in text and picture and practical suggestions for good results included. Use of aluminum paint on steel, galvanized metal, wood, masonry and other surfaces is detailed. Aluminum Company of America.

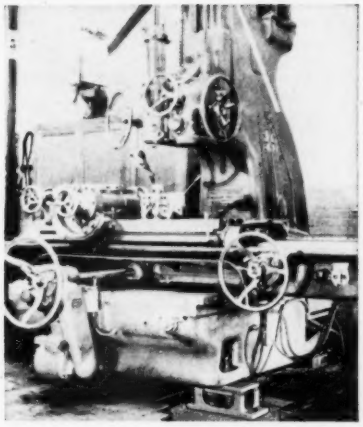
291 **Heavy-Duty Flooring**—An emery aggregate flooring for heavy duty use is discussed in 8-pp Bulletin 653. Gives test data on this flooring. Describes safety features, improved trucking, heat resistance and other advantages. Walter Maguire Co.

292 **Heat Absorbing Glass**—This 16-pp catalog describes Coolite, a glass designed to trap and absorb much of the sun's heat and to filter out annoying glare. Discusses types and thicknesses, gives light transmission data. Pic-

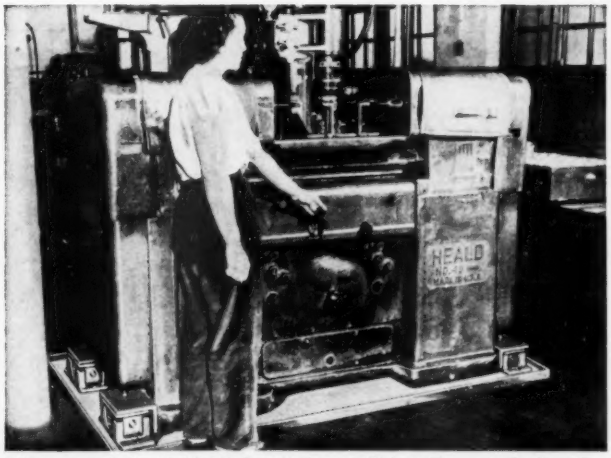
STOP VIBRATION WITH KORFUND VIBRATION CONTROL



This Thompson 12" x 60" Surface Grinder is installed at Firth Sterling, Inc., Pittsburgh, Pa. Vibration from grinders affected precision testing equipment on floor below; vibration and noise was also extremely annoying in executive, sales and laboratory offices. Korfund Isolators directly under the grinders, completely solved the problem. Korfund Units stop vibration and insure quieter machine operation.



This Pratt & Whitney #3B Jig Borer is installed at Caterpillar Tractor Co., Peoria, Illinois. Korfund Vibro-Isolators protect this precision machine against severe external vibration from trucks and trains which had made accurate work impossible. Isolators are set in pockets made by removing wood block flooring. Korfund Units stop vibration and reduce rejects—improve work quality.



This is one of the Heald #49 Bore-Matics installed at Thompson Products Co., Cleveland, Ohio. Shock transmitted from one automatic boring machine to another caused intermittent skips and gouges. One machine had to be kept idle until both were mounted on Korfund Isolators. Now they operate together and turn out perfect work. Korfund Units stop vibration and increase production.

Korfund Vibration Control also: permits more efficient plant layouts, decreases original building and foundation costs, permits installations without reinforcement of floors, reduces machine maintenance costs, and lengthens machine life.

Standard Korfund Isolators are available for most applications. A Selector Chart giving recommendations for both normal and critical conditions is available. See Sweet's Catalog Files or write us for Bulletin No. 5.

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DATA FILE

(Begins on page 189)

tures many industrial installations and shows how conditioned natural illumination helps reduce operating costs. Mississippi Glass Co.

293 **Where to Use Your Stud Driver** — Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and safety precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

294 **Waterproofing Membrane Fabric**—The use of Fiberglas in company's waterproofing membrane is told in "Let's Look At Membranes," 16 pp. Comparisons of Glasfab and other types of membranes are drawn, and complete application methods described. Several case histories, covering industrial roofing jobs, highway bridges, pipe lines and chemical piping, show versatility of product and how it is applied. Twinsburg-Miller Corp.

Postage-free Reader Service Cards make it easy to order any of this literature. See pages 37-38 and 187-188.

295 **Translucent Structural Panels**—Bulletin 533, 12 pp, describes Resolite, a translucent structural material, corrugated or flat, molded of thermosetting polyester resins reinforced with woven glass fibers. Illustrates use of Resolite in partitioning, skylighting and decorating installations. Provides standard sheet specifications, general information on colors, weights, light transmission and thicknesses. Resolite Corp.

296 **How Hardboards Improve Methods**—Twelve-pp Form 5202, on production economies in plant maintenance, materials handling and processing, enumerates applications and specifies types and thicknesses of company's Presdwood for specific purposes. Lists 28 advantages of Presdwood, describes its use in architectural applications, bins, utility boards, cabinetwork, containers, booths and ventilators work surfaces. Masonite Corp.

MAINTENANCE

297 **Basic Roofing Information**—"What You Should Know About Your Roof" is a 40-pp, clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job, also special features of company's roofing materials. Johns-Manville.

298 **Protective Paints** — Details on a rubber-base paint formulated to afford increased protection against corrosion from acids and alkalis, and especially applicable for use on concrete, are provided in this literature. These finishes are also suggested for wood, metal surfaces. Cellulose Products Dept., Hercules Powder Co.

299 **Insulation Surfacing Specifications**—Specifications for the protective surfacing of high, low, or dual-temperature insulations exposed to normal, chemical and physical abuse, indoors or outdoors, are available. A handy index shows company's specifications applicable to each insulation surfacing problem and each insulating material. Benjamin Foster Co.

300 **Tar Base Coatings**—Now available is a collection of five bulletins on company's 100 series of cold applied tar base coatings. One bulletin gives general information on the full line and provides an application chart. The others give detailed specifications and application information on the various types. These include a coating for protection against severest corrosive conditions; a thin high gloss coating for general maintaining purposes; a coating for protection against generally severe corrosive conditions; and one for water tank interiors. Pittsburgh Coke & Chemical Co.

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This book is a real help in sizing steam traps. It takes you through the necessary steps in determining the right steam trap for your needs. It gives air handling considerations, allowances for peak loads, cautions and recommendations, standard practice hints, notes and drawings on installations, maintenance suggestions, other helps and tips. Would you like this kind of help? Then send for your free copy today.

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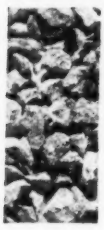

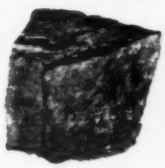

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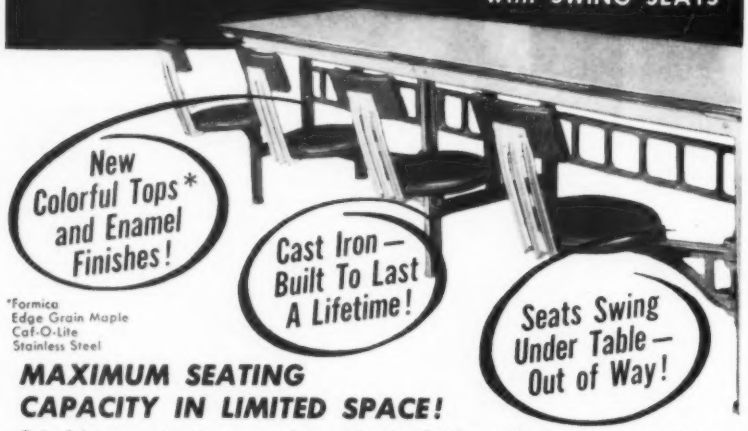

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Seats Swing Under Table — Out of Way!

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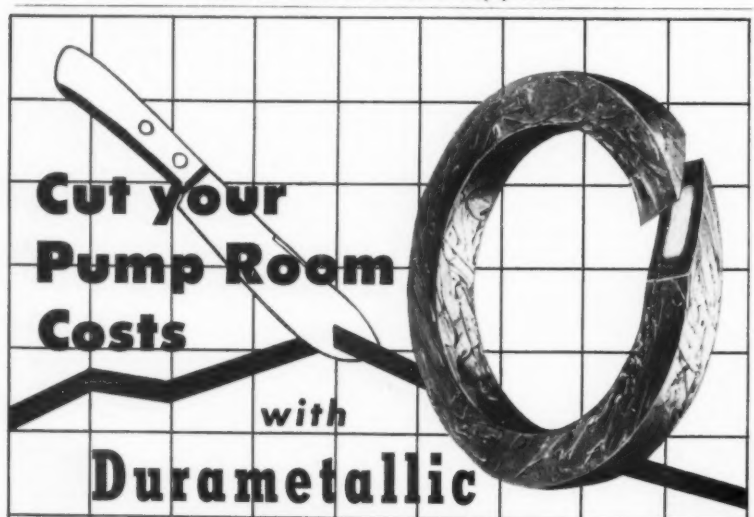

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DATA FILE

(Begins on page 189)

301 Guide to Rust Prevention—The 24-pp 1954 edition of this company's general catalog provides a treatise on rust prevention. Features 94 color chips of manufacturer's products and includes instructions for surface preparation and application of primers, short- and long-oil types, machinery and implement finishes, chemical and heat resistant types, sealers, oil field finishes, thinning oils and floor and masonry coatings. Presents a restful color group of finishes for plant interiors; also describes special finishes. Rust-Oleum Corp.

302 Blower-Suction Cleaner — Data on a portable combination blower-suction cleaner for cleaning machinery, motors, stock bins are offered. Describes models available, attachments for a wide range of cleaning jobs. Clements Mfg. Co.

303 Coatings for Chemical Industry — Advantages and use of synthetic resin-base coatings in the chemical industry are described in this 8-pp brochure. Presents 16 industrial case histories. Specific applications of coatings based on Bakelite and Vinylite resins described include tank cars, oil pipe, acid tanks, sewage disposal plant, shipping containers, plating rack and steel tubing. Also included is tabulation of effects of various chemicals on vinyl resin-base coatings. Bakelite Co., Div., Union Carbide and Carbon Corp.

304 For the Overhead Jobs—Scaffolds designed to make overhead work safer and easier are described in 16-pp Form 10-852. Illustrates and discusses adjustability, large working platform, easy assembly, self-locking trusses and other advantages. Shows how they are readily stacked for height. Baker-Roos, Inc.

305 Proper Care of Floors—Filled with what-to-use and how-to-use-it information, this 32-pp booklet is a well written, practical text on floors. Presents floor preservation as a triple process involving cleaning, sealing and maintaining. Discusses various floor surfaces and their special problems. Gives helpful hints on floor maintenance and provides a handy chart covering preparation procedures and products for 12 common floor surfaces including cement, wood, tile, linoleum, mastic wood. West Disinfecting Co.

306 Floor Scarifier—Bulletin 83.4 describes and pictures a new hydraulically equipped machine designed for removal of traffic-packed grimes from trucking aisles in industrial plants. Explains how it cuts, picks up grime in one operation. G. H. Tennant Co.

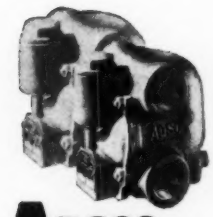
TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

307 Pipe Tool Book — This catalog and data book gives information on pipe and bolt machines, power units, ratchet threaders, reamers and cutters, other power and hand tools. Includes popular "operating guide" section, fully illustrated with easy-to-grasp drawings. Beaver Pipe Tools, Inc.

308 Tools for Mechanics—Catalog U is a 106-pp ordering book covering a wide range of power and hand tools for production, maintenance and service work. Describes, pictures and gives application tips and sizes on wrenches of all types, pullers, drills, sanders, polishers, grinders, reamers, taps and dies, testing tools, soldering irons, tool sets, benches and cabinets. Includes price list. Snap-on Tools Corp.

309 Machine Tools, Their Lubrication—A history of machine tools, an explanation of their mechanical aspects and an analysis of the role of lubricants in their maintenance and operation are contained in this 80-pp booklet. Not a manual on tool lubrication, this book is a comprehensive discussion of fundamental factors in the construction, operation and maintenance of modern machine tools. Shows how power is controlled and force directed to shape metal by cutting and chipping; analyzes factors that contribute to friction and wear; and describes role of lubricants. Shell Oil Co.

310 Resistance Welding—Featured in this 24-pp catalog are newly-designed tips and holders recently added to company's equip-



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WHEN the valve and valve seat of an ADSCO Dual Steam Trap become worn, neither these parts nor the trap itself need to be replaced. Merely reverse the valve and seat by a simple operation and you double the life of the trap...

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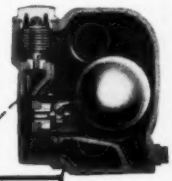

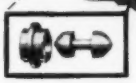

F & T Type

...And here's another great feature of ADSCO Traps. All working parts are mounted on the cover. Pipe connections do not have to be broken for inspection or service...ADSCO Dual Steam Traps are extremely compact with large capacity. Dual inlet and outlet connections reduce installation costs. In the type shown here, an internal thermostatic element provides an automatic air bypass...For complete information, call an ADSCO representative or write the factory.

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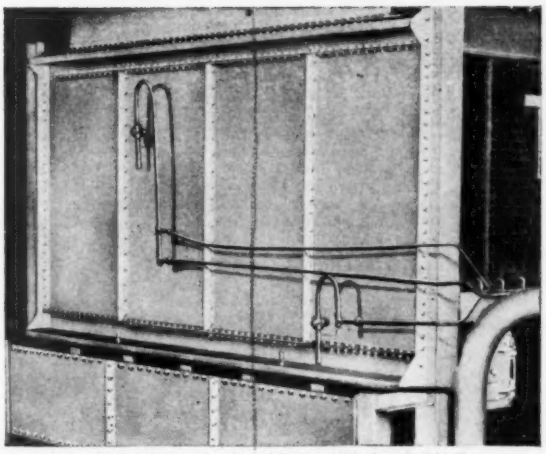

Power House Boiler, Southland Paper Mills, Inc., Lufkin, Texas.
Aluminum Paint: High Heat Aluminum, Napko Paint & Varnish, Houston, Texas.

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NO DISCOLORATION • NO BLISTERING NO FLAKING • NO BURNING OFF

Just one coat of aluminum paint! That's all it took to protect this boiler front for 36 months (when photo was taken) and more. Here is a truly remarkable story of aluminum paint's endurance and toughness —after 3 years, no discoloration, no blistering, no flaking or burning off. Remember too, aluminum paint acts as an insulator under these conditions—reduces heat loss, keeps boiler rooms cooler.

Alcoa does not make paint . . . but ALCOA Aluminum Pigments are used in *more* aluminum paints than any other brand. ALCOA's co-operation with paint manufacturers has made possible many special formulas designed to solve your toughest problem. Aluminum paint offers the utmost in brightness and protection.

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DATA FILE

(Begins on page 189)

ment. Full information is also given about other holders, tips, seam welder wheels and shafts and bushings, in manufacturer's line, as well as flash, butt, barrel and other welding dies. Ampco Metal, Inc.

311 **Hydraulic Pullers**—Industrial maintenance problems involving removal and installation of gears, bearings, pulleys sheaves, pinions shafts, couplings, and tubes are treated in Power-Twin Bulletin HY-1953 24 pp. Covers use and application of pullers, attachments and adaptors for 17½-, 30- and 50-t hydraulic rams. Also shows puller sets for use with company's center-hole rams. Owatonna Tool Co.

312 **Metal Spraying Gun**—Company's Type 4E gun for high-speed spraying with all metals is described in Bulletin 94. A cutaway drawing shows construction features of the gun which is designed for tool-post mounting or hand operation. Metallizing Engineering Co., Inc.

313 **Improved Cutting Oils**—Cutting oils for keeping parts and tools up to 50 deg cooler and representing a new concept in non-emulsifying oils are described in two new technical bulletins. Form A-2724 describes Sunicut 11-S and 209-S, non-staining dual-purpose oils primarily for medium duty to heavy duty operation on automatic screw machines. Form A-2723 covers Sunicut 102-S and 110-S, which contain active-type sulfur and are effective for heavy-duty operations. Sun Oil Co.

PUMPS, COMPRESSORS

314 **Installing a Pump** — Blaming many pump operating troubles on improper pump selection and installation, this 8-pp technical article tells what should be taken into consideration when ordering a pump. Titled, "Studying the Installation," it discusses head, viscosity, pipe friction, suction lifts, horsepower and materials. Illustrated. Viking Pump Co.

315 **How to Solve Pumping Problems**—A new printing of this popular 36-pp booklet makes it again available to plant engineers. Filled with helpful technical information, explains design and operation of rotary gear pumps and discusses factors of pumping problems, covering some sample ones in detail. Illustrated, provides friction loss and conversion tables, electrical data, viscosities of liquids, construction materials for handling various liquids, resistance of valves and fittings to flow of fluids. Geo. D. Roper Corp.

316 **Condensed Pump Data**—Form 4383-J covers more than 20 types of general service pumps, rotary pumps, sump and drainage pumps, condensate units, self-priming units, stainless steel pumps and high pressure pumps. In easy-to-find tabular form, each model is pictured along with its characteristics, applications, and features. Goulds Pumps, Inc.

317 **Data on Pumps**—This 12-pp condensed catalog covers turbine-type and centrifugal pumps for a wide range of industrial uses. Gives construction specifications, capacities, application information as well as reference to specific literature on each type. Fully illustrated. Also includes data on mixed flow pumps, sump pumps. Aurora Pump Co.

318 **"A Turn for the Better"**—Bulletin 30-B, 8 pp, discusses manufacturer's improved Moyno pump, explaining in detail its progressing cavity feature and showing how the rotary motion created provides continuous flow at positive pressure. Stresses performance advantages of the pump. Pump Div., Robbins & Myers, Inc.

319 **Compresors, Pumps**—Catalog 546, 6 pp, presents company's line of air and gas compressors, Oilfreair and Oilfregas compressors, dry vacuum pumps, aftercoolers, Aircheck valves, and centrifugal pumps for boiler feeding and general applications. Pennsylvania Pump and Compressor Co.

320 **Centrifugal Compressors** — Twelve-pp Bulletin 109 describes and pictures single-stage centrifugal compressors for delivering large capacities of pulsation-free air or gases. Their functions, applications, ratings, construction features, arrangements and methods of control are presented. American Blower Corp.

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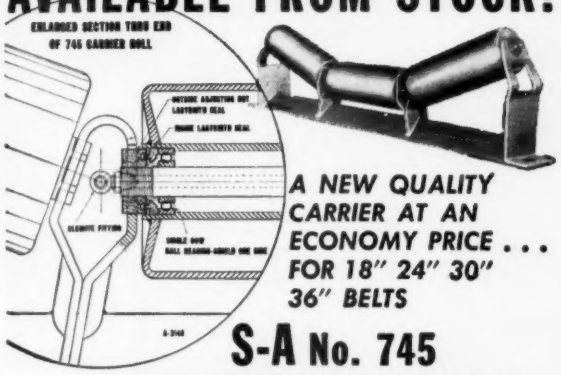

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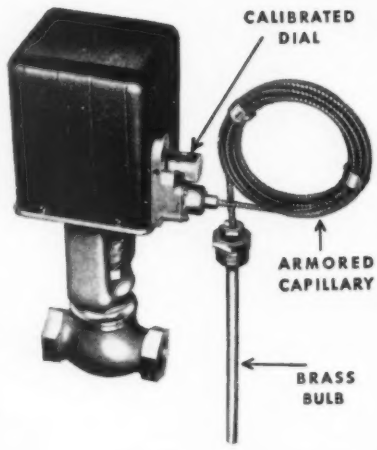

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HEATING, COOLING

321 **Forced Air Space Heaters**—Illustrated Bulletin 523-B, 12 pp, is devoted to a line of forced air heaters for comfort heating, year-round ventilating, tempering make-up air, process drying and heat curing. Explains design efficiency, construction details, operating principle and flexibility of application. Advantages of the heater are detailed. Dravo Corp.

322 **Gas Unit Heater** — Bulletin B-1710A introduces a line of gas unit heaters for automatic controlled heating. Stresses clean heat provided, low installation cost, wide range of gases which may be burned, other advantages of the units available in 25,000 to 200,000 btu capacities. Gives construction features, dimensions; includes wiring diagrams. Warren Webster & Co.

323 **Preheating Combustion Air** — How to reduce fuel consumption as much as 30 per cent by preheating combustion air for process equipment is told in this 12-pp bulletin. Discusses advantages of increased production, improved product quality, and reduced maintenance. Includes tables of operating data, photos and diagrams of typical installations and a chart for determining fuel savings. Air Preheater Corp.

324 **Electric Heaters**—Bulletin E-1, 8 pp, describes electric unit heaters and heater sections for general industrial heating as well as for specialized use in heating corners of factories, warehouses. Illustrates overhead downward discharge heaters with revolving and stationary discharge outlets and a heater with horizontal discharge. An electric duct heater is also described. L. J. Wing Mfg., Co.

325 **Buying a Portable Heater?**—Stressing safety factors involved, this 40-pp booklet, "Guide to the Selection and use of Portable Space Heaters" analyzes temporary heating equipment from standpoints of personnel well being, property protection and fire and accident prevention. Classifies basic types of direct-and indirect-fired portable heating devices giving their advantages and limitations. Provides a guide for evaluating portable heaters in terms of design, construction, operation and safety. Herman Nelson Div., American Air Filter Co., Inc.

326 **Engineering Data for Heating Systems**—A great deal of helpful information on heating systems is presented in Engineering Data Manual 2695. 28 pp. Detailed illustrated information pertaining to heating problems is given. Besides covering heating terminology, there are sections on steam data, water properties, piping data, weights and measures and pipe dimensions. C. A Dunham Co.

327 Heat Exchangers, Storage Heaters—Sixteen-pp Catalog 5 covers more than a dozen types of hot water storage heaters and heat exchangers, including horizontal and vertical hot water storage heaters, instantaneous water heaters, convertors, condensate coolers. Tables

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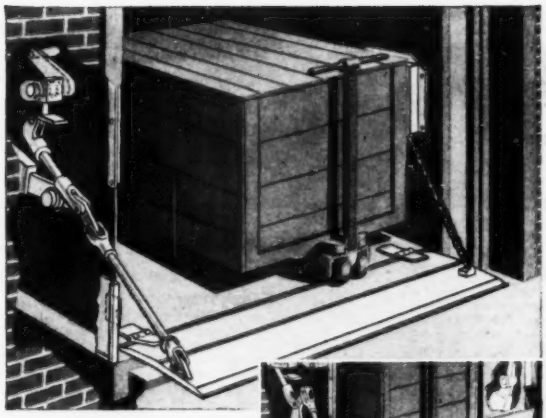

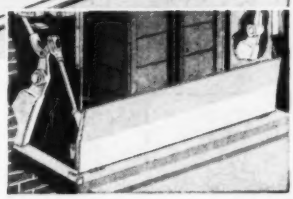

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assist in selecting correct equipment for given operating condition. Patterson-Kelley., Co.

VENTILATING AND AIR CONDITIONING

328 **How Conditioning Units Can Help**—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling, hot water steam heating. Clarage Fan Co.

329 **Air Conditioning Cabinets**—Engineering Bulletin 3703A. 40 pp describes and illustrates manufacturer's Model G cabinets, central units available in both horizontal and vertical models, providing 875 to 22,000 cfm and offering combinations for any function or functions of air conditioning. Booklet gives construction details, discusses heating and cooling coils. Buffalo Forge Co.

330 **Improved Air Conditioning**—Advantages and applications of a controlled humidity method of air conditioning are discussed in Bulletin 112. Process is explained, illustrated. Niagara Blower Co.

331 **To Keep Out Moisture**—Vents designed for easy installation on any roof to keep out wet, foul air are described in this literature. Muckle Manufacturing Co.

332 **Putting Air to Work**—Catalog 600 is an excellent, 60-pp reference text on air and products to put it to work. For plant engineers concerned with heating and ventilating of plant areas; air conditioning installations; means of exhausting fumes, gases and dusts; conveying chips and granular materials; elimination of airborne dirt—this book is a valuable tool. It's packed with information on selecting and applying equipment, and there is a section of frequently-used reference data. Sturtevant Div., Westinghouse Electric Corp.

DUST CONTROL

333 **Dust Control Technology**—Detailed selection, operation and maintenance data are contained in this 50-pp digest-size book, "Industrial Dust Control Through Exhaust Systems." Treats exhaust hoods, piping systems, dust collecting equipment, exhausters and drives. Lists the basic methods of dust control and analyzes elements of systems. Pangborn Corp.

334 **Improved Dust Filters**—Sixteen-pp Bulletin 528-R gives information on continuous-automatic dust filters that can be furnished or unhoused for use on pressure or vacuum. Explains principle of cleaning the filter cloth with high pressure reverse jet air, and tells where these filters are being used. Provides comparative test data on these and other type filters; discusses industrial dust control service offered and diagrams some installations. Self-adjusting blow rings furnished with these filters are described in detail. The Day Co.

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335 **Manual of Exhaust Hood Design**—Bulletin 270-E1, 24 pp, features engineering data on dust control systems for the metal working industries. Illustrates and discusses the design of exhaust hoods for many operations in this field. Also, 61 photos of dust control installations show various methods of hooding dust sources. American Air Filter Co., Inc.

336 **Dust Control**—"Engineered Efficiency in Dust Collection and Recovery." 36 pp discusses industrial dust recovery from standpoint of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size distribution and specific gravity of dust on efficiency of the dust collecting system. Buell Engineering Co., Inc.

PACKINGS, GASKETS, SEALS

337 **Packings and Gaskets**—In this 40-pp belting and packing manual (NY-2697-P) are helpful charts plus information on the care, use and maintenance of rod and sheet packings and gaskets. A complete engineering section contains all necessary charts and tables for determining working specifications of packings. Also included are packing recommendation charts. New York Belting and Packing Co.

338 **Buyer's Guide on Packing**—Twenty-pp Catalog PC-101 brings together all material on company's Palmetto packings and includes data on packing for liquid pistons on inside-packed piston pumps. Greene, Tweed & Co.

339 **Shaft Seals**—Form 455, 12 pp, presents a mechanical seal that rotates with the shaft and is designed to meet sealing requirements of centrifugal and rotary pumps, agitators, blowers, other rotating equipment. Explains advantages of these seals, gives recommended uses for six types, also for a double seal and a cartridge, sleeve seal. Durametallic Corp.

WIRE ROPE, SLINGS

340 **To Keep Wire Rope at Work**—Form 3547 is an 82-pp handbook titled "Here's How to Keep Your Wire Rope Working," and filled with practical tips on care and use of wire rope. Tells how wire rope is constructed, what types are suited to various jobs, how to install it. Covers such subjects as abrasion, lubrication, avoiding kinks, alignment of sheaves, winding on drums, bending fatigue, wire breaks, when to discard a wire rope. Wire Rope Div., American Chain & Cable Co., Inc.

341 **Wire Rope, How to Use It**—Practical information on the use and care of wire rope is given in 72-pp pocket-size Catalog C-51. Covers unloading, storing, breaking in, meth-

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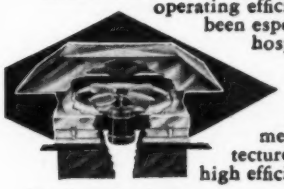

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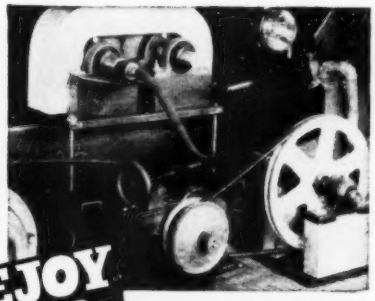

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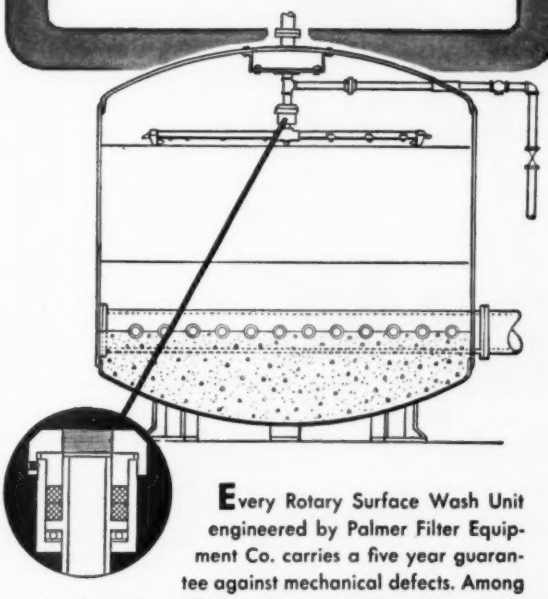

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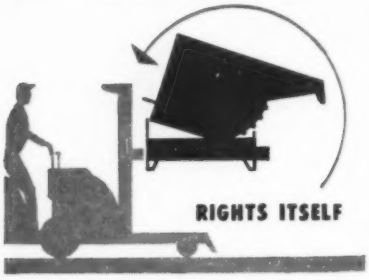

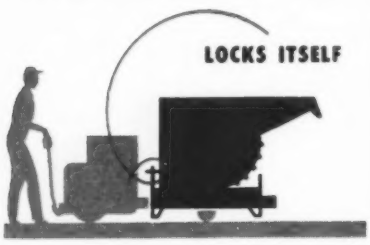

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(Begins on page 189)

ods of seizing and cutting, measuring, end preparations, many other pertinent factors. Fully illustrated with photos and sketches, treats splicing in detail and includes chapter on lubrication. Also presents data on wire rope constructions, efficiencies of fittings. Available to qualified plant engineers. Leschen Wire Div., H. K. Porter Co., Inc.

MAGNETIC EQUIPMENT

342 **Magnetic Selection Guide**—Twelve-pp illustrated Catalog of C-5000-B, describing manufacturer's entire line of magnetic separators and lighting magnets, serves as handy guide to the selection of magnets. Dings Magnetic Separator Co.

343 **Magnetic Pipeline Traps**—Bulletin B-203 describes magnetic pipeline traps for sanitary and standard applications. These permanent (non-electric) traps are designed to remove tramp iron from liquid flow lines and afford protection to processing equipment. Typical trap installation data given. Eriez Mfg. Co.

BOILERS, GENERATORS

344 **Boiler Reference Guide**—General Catalog 80, 32 pp, contains latest and most complete data on manufacturer's line of high and low presure steel boilers for heating, power and process steam. Also includes descriptions of water heating products, both direct fired and storage types, as well as indirect water heating coils. Information on boiler support brackets, structural steel suspension and induced draft fans are also provided in this technical manual. Kewanee-Ross Corp.

345 **Improved Steam Generator**—Bulletin 2000, 28 pp, explains advance design features that distinguish this manufacturer's generator from other unit steam generators. Describes and illustrates engineering differences of component features. Also shows how these components are constructed, assembled and tested. Another section gives data and dimensions and standard and accessory equipment for the units which range from 20 to 6000 hp, for pressures to 250 psi. Preferred Utilities Mfg. Corp.

346 **Oil or Gas Fired Automatic Boilers**—Boiler, burner, controls and safety features of 10 to 500 hp oil or gas fired automatic boilers are described in this 4-pp bulletin. Firing rates, dimensions and capacities are given for all models. Boiler Engineering & Supply Co., Inc.

347 **Shop-Assembled Boiler** — Sixteen-pp, Bulletin G-76, completely describes and illustrates company's Type FM water-tube integral-furnace boiler, made in standard sizes from 2900 to 28,000 lb of steam per hr, pressure to 250 psi. Capacities, dimensions given. The Babcock & Wilcox Co.

348 **Packaged Boilers**—This 16-pp illustrated catalog describes manufacturer's new Type VP package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 30,000 lb per hour. Space requirements are shown in a table along with typical specifications. Combustion Engineering, Inc.

349 **Packaged Automatic Boilers**—Bulletin 1219, 16 pp, describes company's Powermaster packaged automatic boilers in 17 sizes from 15 to 500 hp for steam process and steam and hot water service. Orr & Sembower, Inc.

350 **Water Tube Boilers**—Features of company's Type "C" boiler, described in Bulletin SB-49, include large water holding capacity, fast steaming, large steam relieving surface and production of superheated steam from a standardized design. Discusses method of steam take-off through a bank of tubes into a header. Gives dimensions. Erie City Iron Works.

351 **Steam Generators**—Data and specifications for completely plant assembled water-tube steam generators are contained in this 8-pp bulletin. They cover nine sizes from 5,300 to 33,000 lb steam per hour and for pressures up

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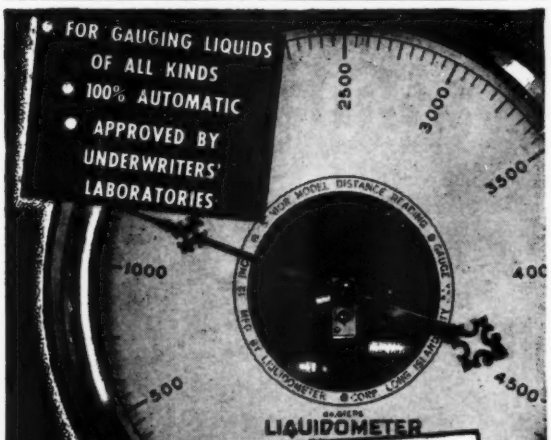

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*We will be glad to send you a copy of the Handbook of Crushing. This book contains data on mechanical size reduction that is not available anywhere else. Pennsylvania Crusher Company (division of Bath Iron Works, Inc.) 1763 Liberty Trust Bldg., Philadelphia 7, Pa.

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DATA FILE

(Begins on page 189)

to 400 psi. These units are designed for fully automatic firing with oil, gas, or stoker-fired coal. Superior Combustion Industries, Inc.

INSULATION

352 Flexible Duct Insulation—Form F-180 describes and gives product specifications for fiber glass flexible duct insulation. Advantages are cited, and easy installation procedure is illustrated. Also included are data on thermal insulating and acoustical insulating qualities. Fiber Glass Div., Pittsburgh Plate Glass Co.

353 Pipe Insulation—Bulletin F 1-100 features on-the-job installation photographs of cellular glass insulation for pipe temperatures between -300 and 800 F. Complete listing of physical properties and condensed recommended specifications made are provided. Pittsburgh Corning Corp.

354 One-Coat Insulation—This 32-pp booklet describes company's Type D insulation, a sprayed-on coating for surfaces with temperature range from —40 to 300 F. Tells how one application of this coating not only insulates but also waterproofs, rustproofs, deadens sound, prevents condensation and resists fire. Tells how to apply. Insul-Mastic Corp. of America.

SAFETY AND SANITATION

355 Advice on Washrooms—Information on company's washroom advisory service is available to plant engineers. Tells of plans and specific suggestions for improving washrooms included in this service. Scott Paper Co.

356 Dry Chemical Extinguishers — New quick-acting fire extinguishers of the dry chemical type in 20 and 30 lb sizes are covered in Form C-104. C-O-TWO Fire Equipment Co.

357 Hand Dryer—Form 1123 describes and pictures a high-speed hand and face dryer for use in industrial washrooms. Tells special features. The Chicago Hardware Foundry Co.

WATER TREATING

358 Boiler Scale—Formation and Prevention—Technical Paper 98 is a 12-pp article covering the cause and prevention of boiler scale. Covers the mechanism of scale formation, effect of boiler scale, chemistry of scale formation, internal chemical treatment and chemical correctives. Diagrams of feeder systems photos and solubility charts in illustrated text. W. H. & L. D. Betz.

359 Solids Contact Reactor—Bulletin 5001-A, 24-pp, discusses a solids contact reactor for clarifying and/or lime softening of water. Explains advantages of this principle, including its catalytic effect, accelerated reactions and larger precipitates, cutting down of detention time, and saving of chemicals. Illustrates basic reactor types available. Cochrane Corp.

360 For Condumetric Determination of Solids—A quick and simple method for determining solids contents of boiler water or condensate is explained and illustrated in Bulletin TRE50. Hall Laboratories, Inc.

OTHER EQUIPMENT

361 Precision Blending System—This 12-pp folder describes the construction, operation, flexibility and wide application of a system for accurately blending, compounding or mixing two or more liquids in increments as low as 1/20 per cent. Stresses long-run economy of system. Illustrated in color. Bowser, Inc.

362 Hose and Tubing—Catalog CC-400 is a 16-pp illustrated quick-reference booklet on manufacturer's flexible metal hose and tubing. These products are made in two basic types: seamless and strip wound. Catalog shows wide range of available alloys and sizes, suggested uses. The American Brass Co.

363 Finishing Systems—Illustrated Catalog A-653, 12 pp, describes complete finishing systems for porcelain and synthetic enamel, lacquer, paint, and other finishing. Also covers a variety of other industrial equipment including ovens, dust collectors and fog filters. The R. C. Mahon Co.

364 Oil Cooling Equipment—Catalog FB-1052, 20 pp, discusses controlled quench oil cooling for uniform quality in heat-treated metals. Describes and illustrates typical installations of coolers; tells how to select cooling systems; and gives circulation rates. Charts show oil recirculation for batch quenching, determination of amounts of oil required. Illustrates accessories including Kleen-Well oil strainers, "Perambulators" oil coolers, junior quencher, pumps. Bell & Gossett Co.

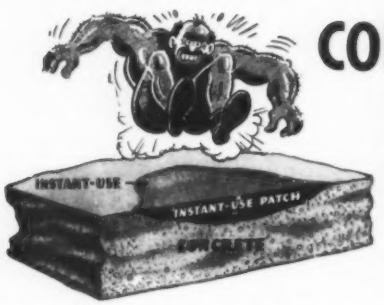
365 Simplified Isolation—A simplified method of machine isolation which utilizes pads and cement is described in this small folder. Explains how it reduces maintenance cost. The Felters Co.

366 Engineered Vibration Control—Bulletin 104 presents spring, cork and rubber mountings, discusses advantages of each and use alone or in combination. Provides helpful selection chart covering a wide range of machines, showing recommended and alternate methods of isolation. The Korfund Co.

367 Socket Head Fasteners—Advantages of company's screw products are described in this folder. Included are socket head cap screws, shoulder screws, flat head socket cap screws and button head socket screws. Also described are socket screw keys, square head set screws, pressure plug and dowel pin. Standard Pressed Steel Co.

368 Data for the Shop—"Fluids and Facts for Metal Working," is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their functions and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts,

INSTANT SETTING CONCRETE FLOOR PATCH



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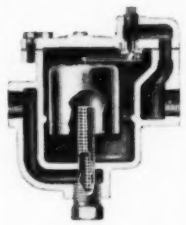
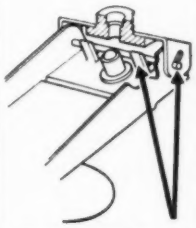
NEW TRAP



Sarco *Camlift* Bucket Trap



Cams lever valve off seat; slot and pin provide maximum valve opening

handles more volume in less time!

Sarco uses the principle of the fulcrum and lever in this newly designed trap and gives you greater discharge at no increase in trap size. Result: more for your steam trap dollar.

It's all made possible by the Sarco *Camlift* valve mechanism which provides the force needed to open the large valve without a corresponding increase in trap size.

See for yourself how this small inverted bucket trap gives you maximum capacity.

Write for free trial trap giving pipe size, capacity, and pressure conditions.

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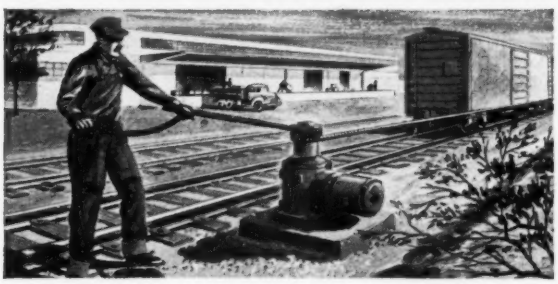

INSTALL a Lo-Hed Car Puller at your siding and cars will be loaded and unloaded without lost time. You'll also cut demurrage costs; eliminate shifting charges; abolish a cause of accidents... Lo-Hed Car Puller makes money *inside* a plant, too. Electrically-driven, rugged, it pulls anything in its capacity that can roll or slide. Write for full facts.

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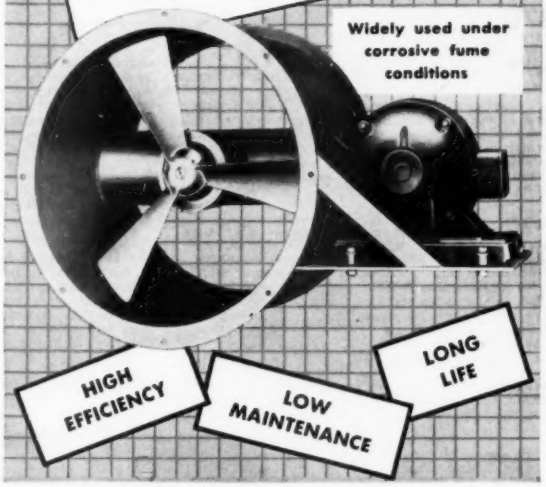
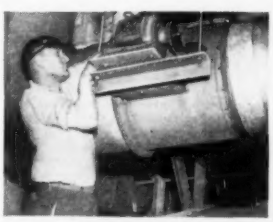
EXPEL GASES, EXPLOSIVE FUMES AND DUSTS

with Propellair "CS" Fans



■ **Propellair** "CS" Fans are rugged, heavy-duty units for duct installation. The cast aluminum alloy airfoil propeller is housed in a welded heavy-gauge steel duct section and belt guard with internal bearing assembly.

Robbins & Myers *All-Weather Motor* located outside airstream. Sizes 20″ to 60″, with certified air deliveries of 3750 to 85,000 c.f.m. Available with corrosion and abrasion-resisting finishes and with ventilated bearings suitable for operation in high temperatures.



Simplified Installation
Propellair "CS" Fans are built to fit standard duct sizes without the need of elbows. The fan drum has front and rear flanges drilled for easy mounting into duct system.

Our engineers are at your service for fan selection and application advice. Write for Bulletin 650PE.

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DATA FILE

(Begins on page 189)

twist drill sizes and other data. Booklet also includes product data on industrial oils, machine tool lubricants, greases, quenching and tempering oils and cutting fluids. Standard Oil Co. (Ind.)

369 **High Pressure Cylinders**—Catalog 233A, 32 pp, covers cylinders for hydraulic operation, for working pressures to 1500 lb. Fifteen models are presented along with dimensions, capacity data, design details. Book also provides information on clevises and mounting brackets, air cylinders and valves. Includes alignment chart. Hanna Engineering Works.

370 **Industrial Leathers**—These illustrated data sheets cover company's leather products and include specifications on various types of leather belting. Also gives data on leather packings for hydraulic and pneumatic equipment. J. E. Rhoads & Sons.

371 **Handbook on Fluid Circuits** — Now available to plant engineers is the second printing of "The Circuit Rider." This 32-pp pocket-size manual presents a down-to-earth discussion, together with drawings, of basic designs in fluid power circuits and points out the wide range of operations possible through the application of different types of such circuits. The Logansport Machine Co., Inc.

372 **Self-Lubricating Bushings** — Eight-pp Bulletin Form 112 discusses company's Graphalloy bushings, designed for strength and high heat dissipating qualities. Also discusses such advantages as durability, no fumes, low and high temperature operation, fire preventive and low coefficient of expansion. Presents engineering data, grades of Graphalloy, physical characteristics. Graphite Metallizing Corp.

373 **Hints on Babbitting Practice**—In outlining basic steps for the prevention of common bearing failures, Bulletin 146, a little 16-pp booklet, covers everything from the choice of metal for a particular bearing application through the correct pouring practice to in-service maintenance. Proper lubrication, a maintenance schedule, and operation at correct speed are discussed. Federated Metals Div., American Smelting and Refining Co.

374 **Neoprene Design Book**—This illustrated bulletin discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Rubber Chemicals Div., E. I. du Pont de Nemours & Co.

To order these catalogs circle item numbers on the handy Reader Service Cards on pages 37-38 and 187-188.

375 **ABC's of Dryness**—Eight-pp Bulletin 16.0.081 presents packaged dehydration units for efficient drying of air or other gases. Tells what these dryers can do, what they will remove dryness from and where they are recommended for use. Explains drying operation; discusses adsorbents and equipment utilized, giving construction details and sizes offered. Typical arrangements for both full-stream and split-stream reactivation are diagrammed, and selection information included. Equipment Div., J. F. Pritchard & Co.

376 **Plumbing, Heating Supplies**—Edition G is the current edition of this company's 118-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated, gives sizes, intended uses and necessary ordering information. J. A. Sexauer Mfg. Co., Inc.

377 **Steel Reservoirs, Standpipes**—This 24-pp booklet pictures installations of reservoirs of 50,000- to 10,000,000-gal capacity, having cone, umbrella or ellipsoidal roofs and ornamental structures with special architectural features. Provides table of standard capacities, information on foundations, data on use of suction tanks for fire protection. Chicago Bridge & Iron Co.

378 **Industrial Ovens** — Thirteen types of company's Convectioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers, plastics producers, rubber manufacturers. Component parts are discussed in detail. The W. W. Sly Mfg. Co.

379 **Fire Extinguisher**—How to extinguish a fire in 11 sec by use of the Fyr-Fyter instant extinguisher with "loaded stream" chemical liquid, "Karbaloy" is pictured in Bulletin F-1158. Lists advantages of 500 lb stainless steel model. The Fyr-Fyter Co.

380 **Improved Steam Valve**—This bulletin describes and illustrates the new Ostlind valve designed to eliminate leakage, unbalanced flow and other causes of valve failure. Shows how valve is designed, explains how it operates, and tells how it should be installed. The Richmond Foundry & Mfg. Co.

381 **Square Design Cylinders**—Illustrated 8-pp Bulletin H-104G gives engineering, design, construction, mounting and dimensional data on a line of space-saving square-design hydraulic cylinders for 2000-3000 psi operation. Arrangement of these data permits quick selection of desired model and bore size and the obtaining of complete mounting and dimensions for model selected. Bulletin covers 13 mounting styles. Miller Fluid Power Co.

382 **How to Glaze with Plexiglas**—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

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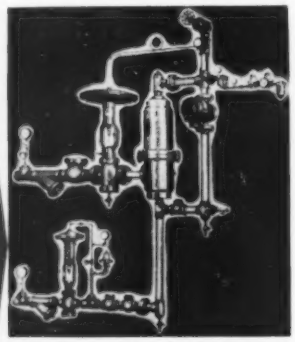

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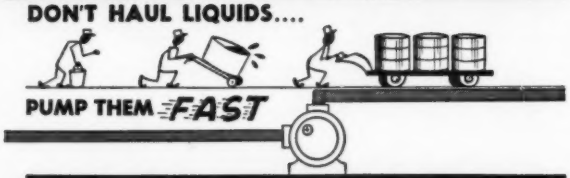

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½ to 1050 gallons per minute capacity range.
Over 600 cataloged models.
Thousands of special designs.
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All types of drive arrangement.

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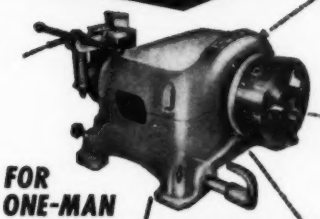

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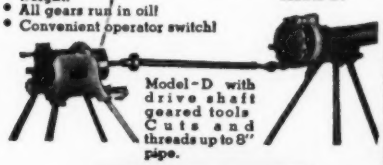

Model-D with drive shaft geared tools Cuts and threads up to 8" pipe.

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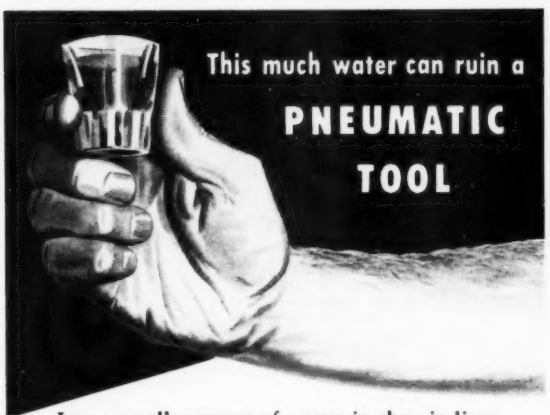

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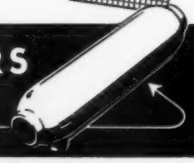

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"What is HERMAN NELSON 3-D HEAT CONTROL?"

It's a new Herman Nelson development that gives 3-way control of heat output for horizontal unit heaters—height control, spread control and distance control.

It's just one more example of how Herman Nelson engineering provides you with industrial heating installations that practically think for themselves. Why let an obsolete heating system go on piling up fuel bills? Change all that . . . change to Herman Nelson Unit Heaters. Send coupon below for complete facts!

CHOOSE THE MODEL AND SIZE TO FIT YOUR JOB FROM THE COMPLETE LINE OF

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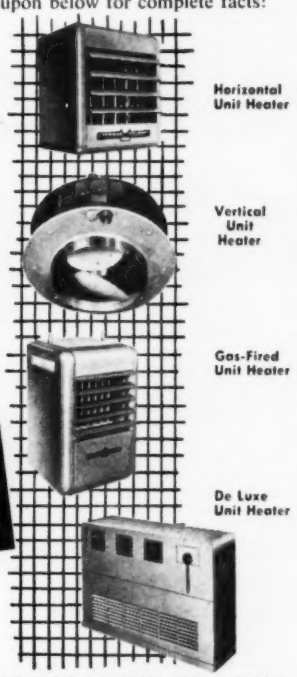

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Agency—George A. Marklin and Associates

ALLOY STEEL PRODUCTS CO. 137
Agency—James Thomas Chirurg Co.

ALUMINUM COMPANY OF AMERICA 205
Agency—Ketchum, MacLeod & Grove, Inc.

AMERICAN AIR FILTER CO., INC. 39
Agency—Doe-Anderson Adv. Agency

AMERICAN AIR FILTER CO. 217
Agency—Zimmer-McClaskey Advertising

AMERICAN BLOWER CORPORATION 74
Agency—Brooke, Smith, French & Dorrance, Inc.

AMERICAN BRASS COMPANY 63
Agency—Kenyon & Eckhardt, Inc.

AMERICAN CHAIN & CABLE CO., 44, 45, 116-117
Agency—Reincke, Meyer & Finn, Inc.

AMERICAN DISTRICT STEAM CO., INC. 205
Agency—Warman, Robbins & Gorham, Inc.

AMERICAN ENGINEERING COMPANY 181, 215
Agency—Beatty & Oliver, Inc.

AMERICAN MACHINE & METALS, INC. 36
Agency—The L. W. Ramsey Adv. Agency

AMERICAN MONORAIL CO., THE 123
Agency—The Bayless-Kerr Company

AMERICAN PHOTOCOPY EQUIPMENT CO. 178
Agency—Irving J. Rosenbloom Adv. Agency

ANDERSON COMPANY, THE V. D. 203, 217
Agency—Will, Incorporated

AURORA PUMP COMPANY 205
Agency—Fred A. Hinrichsen Advertising Agency

BABCOCK & WILCOX CO. 220
Agency—O. S. Tyson & Co., Inc.

BAKER-RAULANG COMPANY, THE 1
Agency—G. M. Basford Company

BAKER-ROOS, INC. 198
Agency—Geo. S. Diener Company

BARBER-COLMAN COMPANY 208
Agency—Howard H. Monk & Associates

BEAVER PIPE TOOLS 217
Agency—Meek & Thomas, Inc.

BELL & GOSSETT COMPANY 22
Agency—Perrin-Paus Company

BENJAMIN ELECTRIC MFG. CO. 57
Agency—Van Auken, Ragland & Stevens

BETZ, W. H. & L. D. 29
Agency—The Michener Company

BLACK & DECKER MFG. CO., THE 167
Agency—Vansant, Dugdale & Co., Inc.

BOILER ENGR. & SUPPLY CO., INC. 138
Agency—William Jenkins, Advertising

BONNEY FORGE & TOOL WORKS 155
Agency—Seberhagen, Incorporated

BOWSER, INC. 202
Agency—Willis S. Martin Co.

BUCYRUS-ERIE COMPANY 168
Agency—Bert S. Gittins, Advertising

BUELL ENGINEERING COMPANY 195
Agency—Hicks & Greist, Inc.

BUFFALO FORGE COMPANY 60
Agency—Melvin F. Hall Adv. Agency, Inc.

BYERS COMPANY, A. M. 3
Agency—Ketchum, MacLeod & Grove, Inc.

CARBIDE & CARBON CHEMICALS CO. 212
Agency—J. M. Mathes, Inc.

CHESAPEAKE & OHIO RAILWAY 135
Agency—Robert Conahay, Inc.

CHICAGO BRIDGE & IRON CO. 160
Agency—Russell T. Gray, Inc.

CHICAGO HARDWARE FOUNDRY CO., THE 204
Agency—Wilson Advertising Service

CHICAGO PNEUMATIC 145
Agency—G.M. Basford Company

CHILDERS MANUFACTURING COMPANY 177
Agency—Bruce B. Brewer & Co.

CLEMENTS MFG. COMPANY 214
Agency—L. H. Gross & Associates

CLEVELAND CRANE & ENGINEERING CO., THE ..... Third Cover

CLING SURFACE COMPANY 209
Agency—The Pursell Company

COCHRANE CORPORATION 151
Agency—Hening & Company, Inc.

COFFING HOIST COMPANY 196
Agency—Bert S. Gittins Adv.

COLORADO FUEL & IRON CORPORATION, THE WICKWIRE SPENCER STEEL DIV., THE 157
Agency—Doyle, Kitchen & McCormick, Inc.

COMBUSTION ENGINEERING, INC. 10-11
Agency—G. M. Basford Company

C-O-TWO FIRE EQUIPMENT CO. 171
Agency—G. M. Basford Company

CRANE CO. 131
Agency—The Buchen Company

CROUSE-HINDS COMPANY 163
Agency—Barlow Advertising Agency, Inc.

CULLEN-FRIESTEDT COMPANY 206
Agency—Ross Llewellyn, Inc.

CUTLER-HAMMER, INC. ..... Back Cover
Agency—Kirkgasser-Drew

DEMPSTER BROTHERS, INC. 17
Agency—Charles S. Kane Co.

DIAMOND CHAIN COMPANY, INC. 53
Agency—Kirkgasser-Drew

DINGS MAGNETIC SEPARATOR CO. 69
Agency—Russell T. Gray, Inc.

DODGE MFG. CORPORATION 26-27
Agency—Lamport, Fox, Prell & Dolk, Inc.

DOWNS CRANE & HOIST COMPANY 213
Agency—Steller, Millar & Lester, Inc.

DRAVO CORPORATION 203
Agency—Ketchum, MacLeod & Grove, Inc.

DUNHAM COMPANY, C. A. 149
Agency—The Buchen Company

DURAMETALLIC CORPORATION 204
Agency—M. Dale Ogden, Advertising

ECONOMY FUSE & MFG. CO. 165
Agency—Van Auken, Ragland & Stevens

ELECTRIC CONTROLLER & MFG. CO., THE 169
Agency—Penn & Hamaker, Inc.

ELECTRIC STORAGE BATTERY CO., THE 73
Agency—Geare-Marston, Inc.

ELLIOTT COMPANY 147
Agency—Peterson & Kempner, Inc.

ELWELL-PARKER ELECTRIC CO., THE 24
Agency—The Bayless-Kerr Company

ERIEZ MANUFACTURING CO., INC. 127
Agency—Gotham Advertising Co., Inc.

FAIRBANKS, MORSE & CO. 121
Agency—The Buchen Company

FEEDRAIL CORPORATION 170
Agency—Peterson & Kempner, Inc.

FELTERS COMPANY, THE 146
Agency—Sutherland-Abbott

FISKE BROTHERS REFINING COMPANY LUBRIPLATE DIVISION 28
Agency—E. M. Freystadt Associates, Inc.

FLEXROCK COMPANY 214
Agency—Walter S. Chittick Company

FOSTER COMPANY, THE BENJAMIN 166
Agency—Elmer Cook Associates

FYR-FYTER COMPANY 48
Agency—Weber, Geiger & Kalat, Inc.

GARDNER-DENVER COMPANY 50
Agency—The Buchen Company

GATES RUBBER COMPANY, THE 8
Agency—Cloyd F. Woolley, Inc.

GENERAL CABLE CORPORATION 12
Agency—Hicks & Greist, Inc.

GENERAL ELECTRIC COMPANY
APPARATUS DIVISION 21, 71
CONSTRUCTION MATERIALS DIVISION 72
Agency—G. M. Basford Company

GOODRICH COMPANY, THE B. F. 23
Agency—The Griswold-Eshleman Company

GOULD-NATIONAL BATTERIES, INC. 55
Agency—Hutchins Advertising Co., Inc.

GOULDS PUMPS, INC. 140
Agency—Charles L. Rumrill & Co., Inc.

GRAPHITE METALLIZING CORPORATION 196
Agency—The Kotula Company

GREENE, TWEED & COMPANY 211
Agency—Raf Advertising, Inc.

GRINNELL COMPANY, INC. 5
Agency—Horton-Noyes Company

GULF OIL CORPORATION 14-15
Agency—Young & Rubicam, Inc.

HALL LABORATORIES, INC. 143
Agency—Ketchum, MacLeod & Grove, Inc.

HEIL PROCESS EQUIPMENT CO. 200
Agency—The Lee Donnelley Company

IDEAL INDUSTRIES, INC. 190
Agency—Glenn-Jordan-Stoetzel, Inc.

ILLINOIS ENGINEERING COMPANY 210
Agency—C. Lynn Coy, Adv.

IMPERIAL BELTING COMPANY 190
Agency—Greenhaw & Rush, Inc.

INSUL-MASTIC CORP. OF AMERICA 51
Agency—Dan A. Sullivan

JENKINS BROS. 159
Agency—Horton-Noyes Company

JOHNS-MANVILLE, INC. 134
Agency—J. Walter Thompson Co.

JONES & LAMSON MACHINE CO. 65
Agency—Henry A. Loudon Adv., Inc.

JONES & LAUGHLIN 41, 124
Agency—Ketchum, MacLeod & Grove, Inc.

KORFUND COMPANY, INC., THE 201
Agency—Sanger-Funnell, Inc.

LESCHEN WIRE ROPE DIVISION THE WATSON-STILLMAN COMPANY (Subsidiary of H. K. Porter Co., Inc.) 219
Agency—Arthur R. MacDonald, Inc.

LEWELLEN MANUFACTURING COMPANY 194
Agency—Zimmer-McClaskey, Adv.

LIQUIDOMETER CORP., THE 213
Agency—Lucerna Company, Inc.

LOGANSPORT MACHINE COMPANY, INC. 182
Agency—Willis S. Martin Company

LOVEJOY FLEXIBLE COUPLING CO. 211
Agency—Symonds, MacKenzie & Co., Inc.

LUBRIPLATE DIVISION, FISKE BROS. REFINING COMPANY 28
Agency—E. M. Freystadt Associates, Inc.

MAGUIRE COMPANY, INC., WALTER 203

MAHON COMPANY, THE R. C. 47
Agency—Anderson, Inc.

MAIN BELTING COMPANY 144
Agency—Renner Advertisers

MANNING, MAXWELL & MOORE, INC. 30
Agency—Fuller & Smith & Ross, Inc.

MANZEL 156
Agency—Baldwin, Bowers & Strachan, Inc.

MASONITE CORPORATION 185
Agency—The Buchen Company

MATHEWS CONVEYERS 162
Agency—Meek & Thomas, Inc.

MERCURY MANUFACTURING CO., THE 175
Agency—O'Grady-Anderson-Gray, Inc.

MISSISSIPPI GLASS COMPANY 64
Agency—Ralph W. Smith Adv. Agency

MUCKLE MFG. COMPANY 211
Agency—Jefferson Adv. Agency, Inc.

NAYLOR PIPE COMPANY 198
Agency—Fred H. Ebersold, Inc.

NEW YORK BELTING & PACKING CO. 70
Agency—Fletcher D. Richards, Inc.

NIAGARA BLOWER COMPANY 148
Agency—The Moss-Chase Co.

NORGREN COMPANY, C. A. 16, 129
Agency—Walter L. Schump

NORTHERN BLOWER COMPANY, THE 152
Agency—Carr-Liggett Adv., Inc.

OBERDORFER FOUNDRIES, INC. 209
Agency—Richards & Webb, Inc.

OHIO INJECTOR CO., THE ..... Second Cover
Agency—Fuller & Smith & Ross, Inc.

ORR & SEMBOWER, INC. 76-77
Agency—Beaumont, Heller & Sperling, Inc.

ORTON CRANE & SHOVEL CO. 42
Agency—W. S. Kirkland Advertising

OWATONNA TOOL CO. 208
Agency—E. T. Holmgren, Inc.

PATTERSON-KELLEY COMPANY, INC. 186
Agency—O. S. Tyson & Company, Inc.

PENNSYLVANIA CRUSHER COMPANY 213
Agency—The Lyle T. Johnston Co.

PENNSYLVANIA PUMP & COMPRESSOR CO. 192

PICK MANUFACTURING COMPANY 216
Agency—Ramsthal Advertising Agency

PITTSBURGH COKE & CHEMICAL CO. 31
Agency—Walker & Downing

PITTSBURGH CORNING CORPORATION 9
Agency—Ketchum, MacLeod & Grove, Inc.

PITTSBURGH PLATE GLASS CO. FIBER GLASS DIVISION 193
Agency—Ketchum, MacLeod & Grove, Inc.

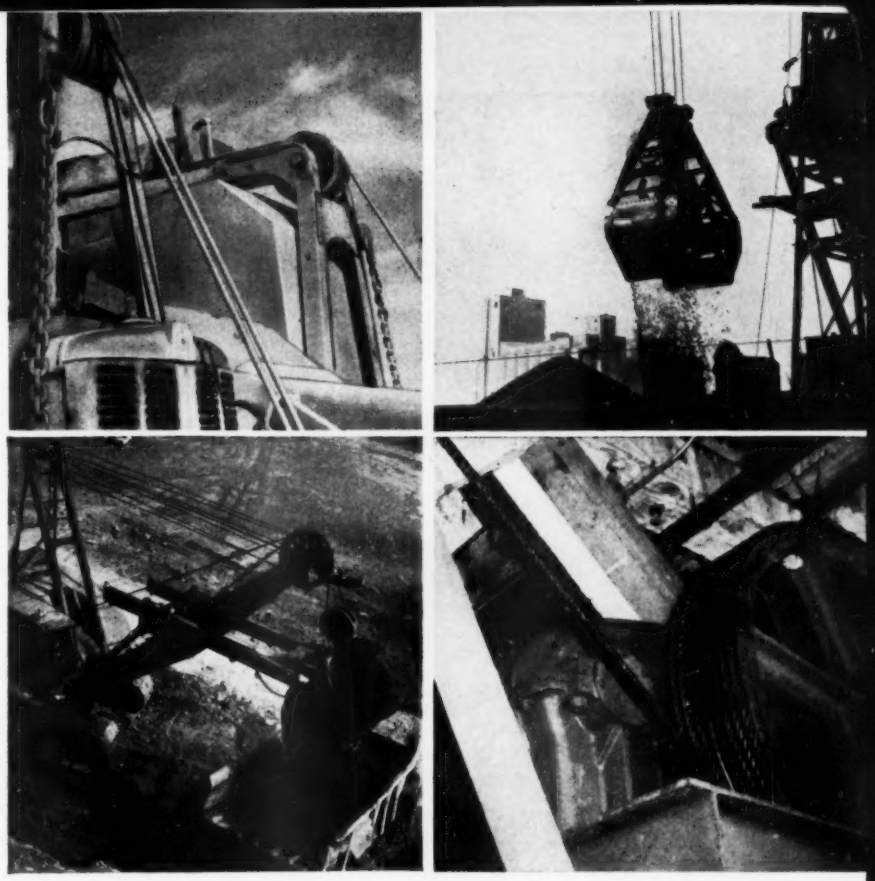
POLYMER CORPORATION OF PA., THE 174
Agency—Beaumont, Heller & Sterling, Inc.

POWERS REGULATOR CO., THE 59
Agency—Symonds, MacKenzie & Company, Inc.

PRITCHARD CO. OF CALIFORNIA, J. F. 43
Agency—Carter Advertising Agency, Inc.

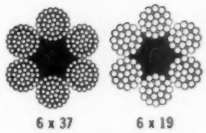
RADIANT LAMP CORP. 184
Agency—Joseph S. Vogel & Co.

READING CRANE & HOIST CORP. 158
Agency—Beaumont, Heller & Sperling, Inc.
REMINGTON ARMS COMPANY 191
Agency—Batten, Barton, Durstine & Osborn
RESOLITE CORPORATION 200
Agency—Dan W. Frye, Adv.
RHOADS & SONS, J. E. 172
Agency—R.E. Lovekin Corporation
RICHARDS-WILCOX MFG. COMPANY 176
Agency—George H. Hartman Co.
RICHMOND FOUNDRY & MFG. CO. 78
Agency—Lindsey & Company
ROBBINS & MYERS, INC. 6-7, 75
Agency—Erwin, Wasey & Co., Ltd.
ROBBINS & MYERS, INC. 215
Agency—Greenhaw & Rush, Inc.
ROBBINS & MYERS, INC. 173
Agency—Odiorne Industrial Adv., Inc.
ROCKWELL MFG. COMPANY 139, 164
Agency—Marsteller, Gebhardt & Reed, Inc.
ROURA IRON WORKS, INC. 212
Agency—Marsteller, Gebhardt & Reed, Inc.
RUST-OLEUM CORPORATION 18-19
Agency—O'Grady-Anderson-Gray, Inc.
SARCO COMPANY, INC. 215
Agency—Rickard & Company, Inc.
SCHRADER'S SON, A. 133
Agency—G. M. Basford Company
SCOTT PAPER COMPANY 119
Agency—J. Walter Thompson
SERVICE CASTER & TRUCK CORP. 207
Agency—Guy C. Core Company
SEXAUER MFG. CO., INC., J. A. 180
Agency—Lawrence Peskin, Inc.
SHELL OIL COMPANY 66
Agency—J. Walter Thompson Co.
SILL COMPANY, ALEXANDER 209
Agency—Arthur C. Barnett, Adv.
SIMPLEX TIME RECORDER CO. 207
SKF INDUSTRIES, INC. 154
Agency—O. S. Tyson & Co., Inc.
SLY MFG. COMPANY, THE W. W. 46
Agency—The Bayless-Kerr Company
SNAP-ON TOOLS CORPORATION 58
Agency—The Cramer-Krasselt Co.
SNAP-TITE, INC. 194
Agency—Hatch & Treat
SOCONY-VACUUM OIL CO., INC. 61
Agency—Compton Advertising, Inc.
SORGEL ELECTRIC COMPANY 197
Agency—O. Grigg Advertising
SQUARE D COMPANY 13
Agency—Reincke, Meyer & Finn, Inc.
STANDARD OIL CO. (INDIANA) 49
Agency—McCann-Erickson, Inc.
STANDARD PRESSED STEEL CO. 20
Agency—Gray & Rogers
STEPHENS-ADAMSON MFG. CO. 207
Agecy—Glenn, Jordan, Stoezel, Inc.
SUN OIL COMPANY 35
Agency—Gray & Rogers
SWEET'S CATALOG SERVICE 192
Agency—The Schuyler Hopper Co.
SWIVELIER COMPANY, INC. 206
Agency—Friend-Reiss-McGlone Adv.
TENNANT COMPANY, G. H. 40
THOMAS FLEXIBLE COUPLING CO. 4
Agency—Reinhold C. Ferster Adv.
TOLEDO SCALE COMPANY 150
Agency—Beeson-Reichert, Inc.
TWINSBURG-MILLER CORPORATION 161
Agency—The Jayme Organization, Inc.
UNION METAL MFG. CO. 56
Agency—The Griswold-Eshleman Co.
UNITED STATES INSTRUMENT CORP. 202
Agency—Felt Advertising, Inc.
VIKING PUMP COMPANY 216
Agency—J. M. Hickerson, Inc.
WAGNER ELECTRIC CORPORATION 33
Agency—Arthur R. Mogge, Incorporated
WALWORTH 141
Agency—G. M. Basford Company
WARREN WEBSTER & COMPANY 136
Agency—William Jenkins Advertising
WAYNE PUMP COMPANY 153
Agency—A. E. Aldridge Associates
WEST DISINFECTING COMPANY 179
Agency—G.M. Basford Company
WESTINGHOUSE ELECTRIC CORPORATION STURTEVANT DIVISION 183
Agency—Fuller & Smith & Ross, Inc.
WESTON ELECTRICAL INSTRUMENT CORP. 199
Agency—G. M. Basford Company
WING MFG. CO., L. J. 142
Agency—Willard G. Myers Adv. Agency
YALE & TOWNE MFG. CO., THE 79
Agency—Ruthrauff & Ryan, Inc.
YARNALL-WARING COMPANY 80
Agency—The Michener Company



WHEN WIRE ROPE requires extra flexibility and must also lift or pull heavy loads, an unusually pliable, strong rope is needed. Rope jobs like paver skip hoists, overhead cranes, large shovel and dragline hoists, and sawmill carriages demand these qualities. That's where the use of 6 x 37 Red-Strand wire rope saves time and money.

Where will 6x37 Red-Strand improve your wire rope service?



6 x 37 6 x 19

Look at a cross section of 6 x 37 wire rope. You see three rings of small, uniformly sized wires in each strand. This differs from a rope construction like 6 x 19, which contains fewer and larger wires.

The *smaller size* wires make 6 x 37 more *flexible*. The *larger number* of wires maintains rope *strength*.

Would this combination improve your wire rope service? Would it solve a problem for you? Leschen's higher-than-rated quality is also providing longer-than-expected service to heavy industry everywhere.

Check with your Leschen man. He can help you.

Leschen's 64-page Wire Rope Handbook tells you all about 6 x 37 and other Red-Strand wire rope constructions. Ask or send for your free copy.

LESCHEN WIRE ROPE DIVISION
The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri

LESCHEN
HERCULES Red-Strand
WIRE ROPE

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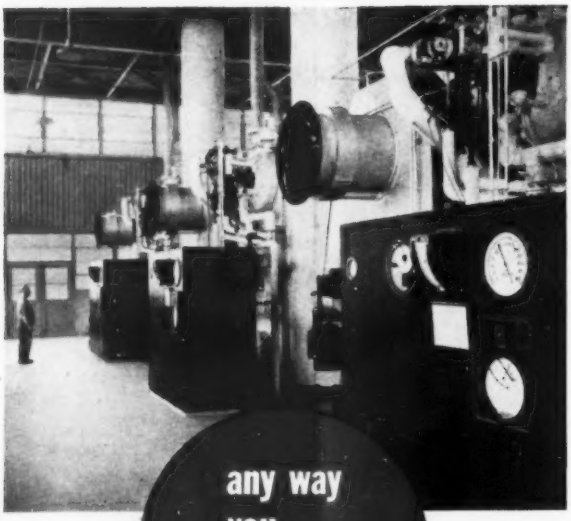
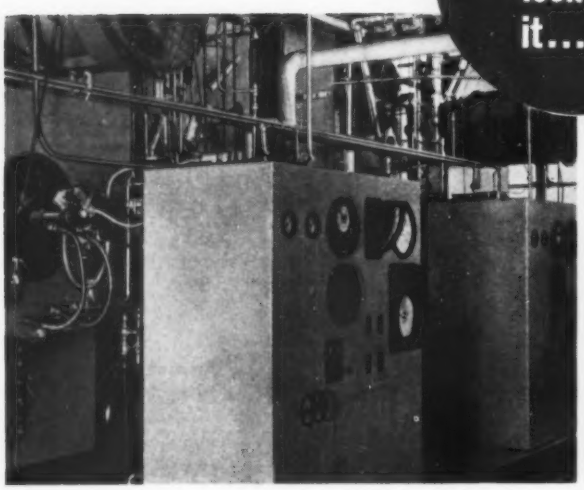
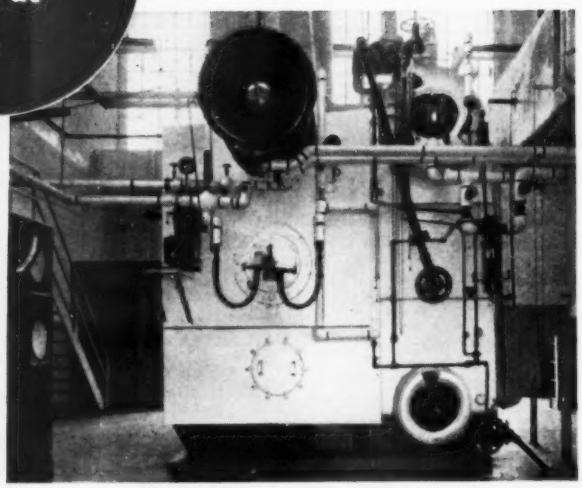


any way you look at it...





The B&W Integral-Furnace Boiler, Type FM

is compact, portable, simple, reliable

Almost one and one-half million pounds of steam capacity for building heating and allied services already have been credited to the B&W Integral-Furnace, Type FM. This shop-assembled unit, for steam loads between 2900 and 28,000 lb per hr at pressures to 235 psi, enjoys such wide popularity with users in a broad range of industrial, commercial, institutional and other classifications that, today, FM Boilers are in service or on order for a total steam capacity of more than 7,000,000 lb per hr.

Automatic control and efficient handling of variable loads are among the many features of this versatile B&W steam generator. The unit is easy to install, and is delivered complete with firing equipment for oil or gas, ready to skid or lift into position, hook-up and place in operation.

The Type FM Boiler has proved to be ideal for small to medium-sized installations where operators have additional duties . . . even for larger installations, two or more Type FM Boilers often are selected instead of large boilers requiring complete field erection and close operating supervision.

COST-SAVING FEATURES

- Saves Erection Time and Cost
- Meets Wide Range of Service
- Handles Quick Load Changes
- Fast Steaming
- Low Maintenance
- Easy Accessibility
- Burns Oil and/or Gas
- Saves Fuel
- Saves Space
- Safe, Automatic Operation

BABCOCK & WILCOX

BOILER DIVISION

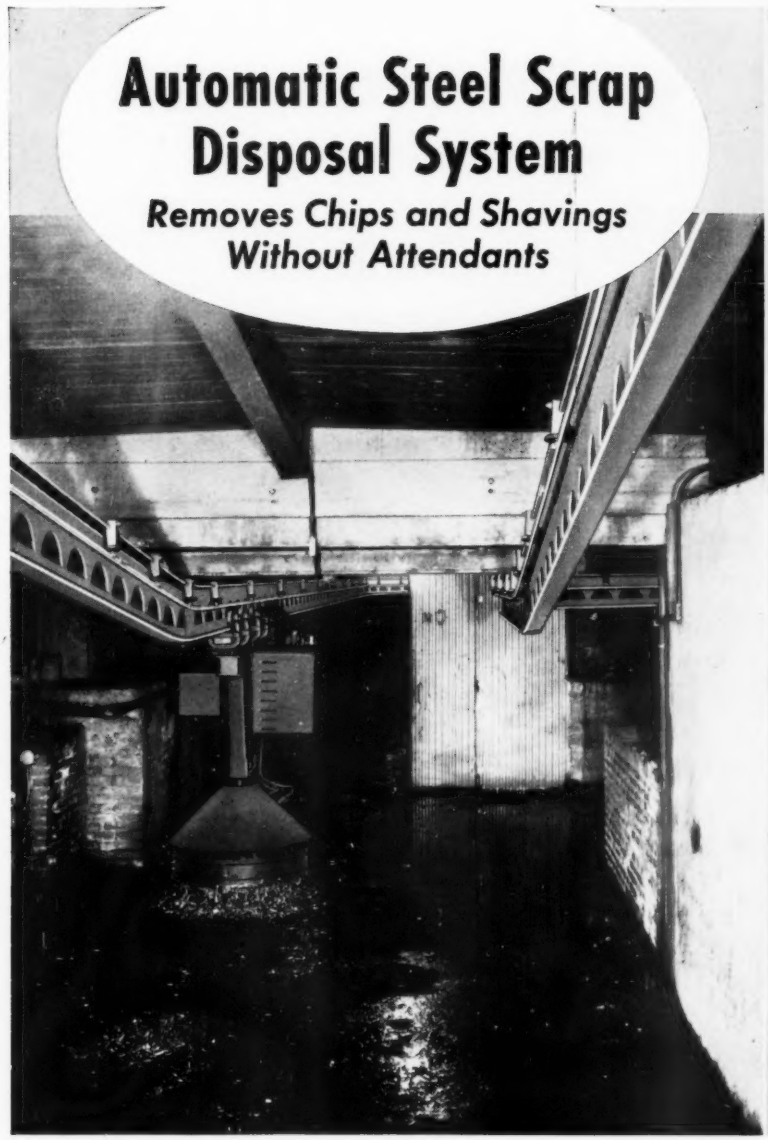
Write for Bulletin G-76B, which details the cost-saving features of the B&W Integral-Furnace Boiler, Type FM. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

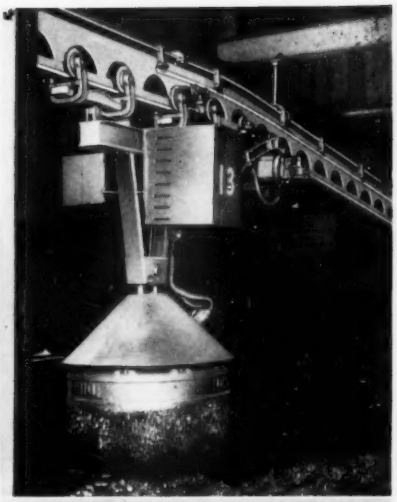
G-630

For more facts circle 686 on Reply Card

Automatic Steel Scrap Disposal System

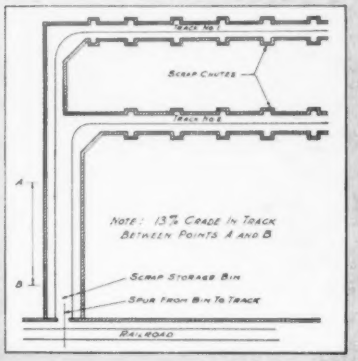
Removes Chips and Shavings Without Attendants





A load of scrap about to be dropped in bin. Carrier immediately reverses after unloading and starts another trip.

View of tracks near beginning of tunnels. Carrier is shown approaching track incline on way to bin with a load.



ONE carload of metal chips and shavings is picked up and moved daily with an automatic Cleveland Tramrail magnet-carrying system that operates unattended in two parallel tunnels under metal-working machines.

Each tunnel has its own Tramrail track on which a magnet carrier travels back and forth, picking up scrap that comes down from the machines on floor above. The scrap is conveyed to a bin next to a railroad siding. The system was put into operation in 1942 and has proven an extremely efficient and low-cost method for ferrous scrap disposal.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7585 East 284 Street, Wickliffe, Ohio

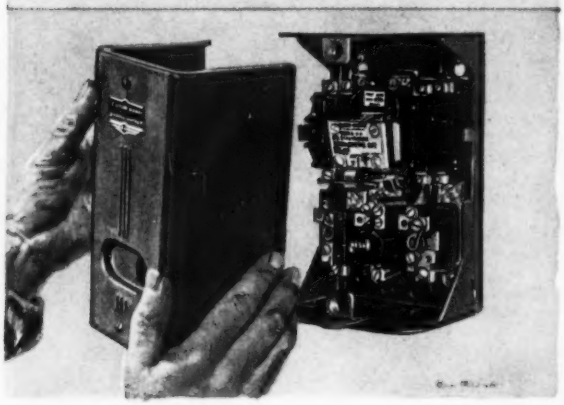
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

For more facts circle 687 on Reply Card

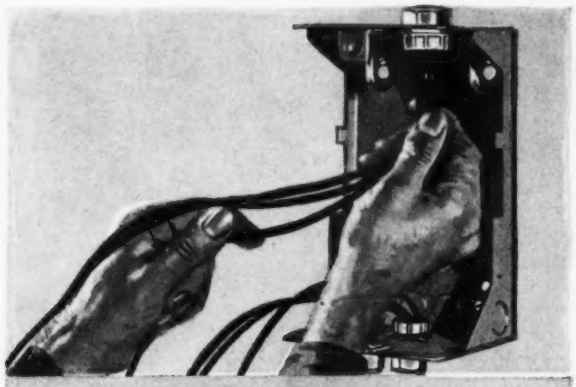
THE THREE CUTLER-HAMMER STARS ★ ★ ★ STAND FOR THREE NEW STANDARDS

☆ installs easier
☆ works better
☆ lasts longer

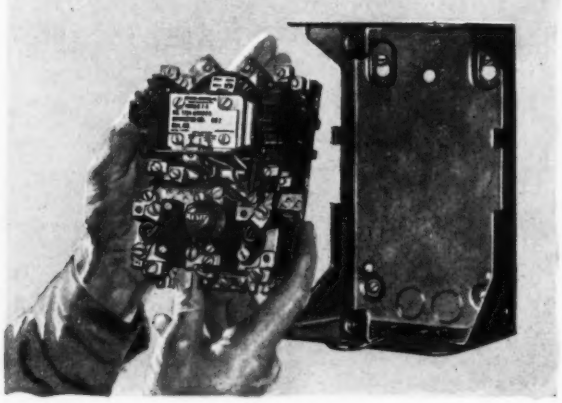
1. Just loosen two screws . . . and off comes wrap-around cover. Screws *stay* in cover, do not fall into machines or get lost on floor; a typical time-saving design detail.



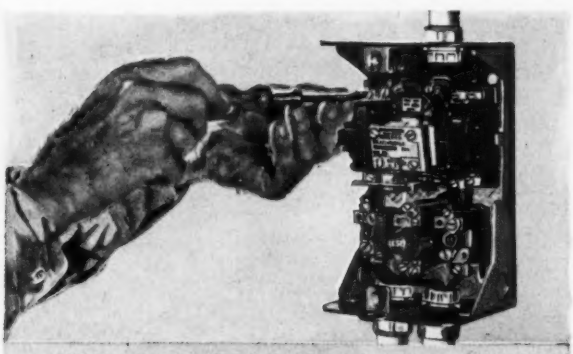
3. Pull in wires . . . Making conduit connections and pulling wires is a cinch. No starter mechanism or side walls of case in the way. No skinned knuckles or damaged starters.



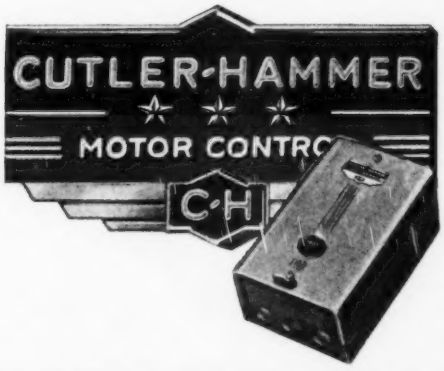
2. Remove entire starter mechanism . . . by merely loosening three screws. Then light, easy-to-handle skeleton case can be installed. Embossed mounts for good job on uneven surfaces. And upper mounting holes are keyhole slotted.



4. Connect up and go . . . Straight-through wiring; all line terminals at top, load terminals at bottom. All terminals are clearly marked and visible from front. Pressure connectors throughout. All panel wiring is color coded.



Factory records everywhere today show the cost of installing motor control is almost always greater than the cost of the equipment, often two to three times as much. That is why Cutler-Hammer engineering made easier installation a key objective in designing the new Cutler-Hammer ☆ ☆ ☆ Motor Control. When you buy motor control, figure its *real* cost, its installed cost. Then you too will insist on Cutler-Hammer! Your nearby Cutler-Hammer Authorized Distributor is ready to serve your needs. Order from him today.
CUTLER-HAMMER, Inc., 1447 St. Paul Ave., Milwaukee 1, Wis.



CUTLER-HAMMER ★ ★ ★ MOTOR CONTROL

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MAY, 1954

Plant Engineering

IN THIS ISSUE

Is It True What They Say About "Moly"? 87
Television Interference Elimination 90
Plant Guards Prevent Accidents "In-the-Making" 92
Texans Start Club in Houston 93
Coal Handling Costs Cut 68 Per Cent 94
Here, Coal Unloading Costs Get Fast Shakedown 95
Design and What It Does to Help Maintenance 96
Tell-Tale Instrument Checks Conditions 98
Plastic Film Protects Metal from Corrosion 100
New Drives Handle Big Production Increase 101
Cutting, Finishing Plastics 103
Filtration Saves Thousands in Maintenance and Materials 105
Power Factor Can Be Measured by Ammeter 106
Stainless Steel—Uses, Abuses, Forms, Finishes 108
Subsurface Investigation—
Insurance Against Plant Damage 112
Portable Hack Saws Work in Any Position 115
Analyzing Indirect Production Costs 116
Vibration in Electrical Machinery—Part II 118
Fast Bulk Handling Built into New Plant 122
How to Use Test Data to Calculate
Cooling Tower Performance 124
Threaded Piping in Industry 136
What's New in Buildings? 144

REGULAR DEPARTMENTS

'Round About with the Editors 2
Backtalk About Our Past Issues 26
Plant Engineers' Digest 30
Bulletins and Catalogs 35
Operation and Production 56
Construction Briefs 69
News from the Plants 150
New Products and Processes 156
New Books Reviewed 210
Data File of Commercial Literature 219
Industrial Films 246
Advertisers' Index 250

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